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The Internal AUDITOR

JOURNAL OF THE INSTITUTE OF INTERNAL AUDITORS

WINTER 1961

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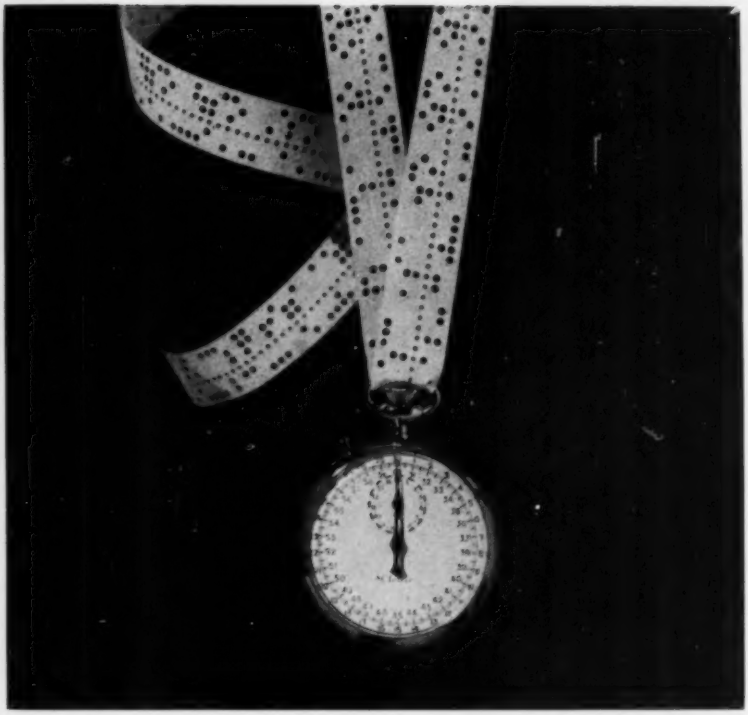

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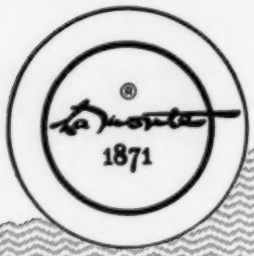

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The Internal Auditor

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Vol. 18 WINTER 1961 No. 4

THE PRESIDENT'S PAGE

INTERNAL AUDITORS can do a great deal toward encouraging the recognition and progress of their profession. As the scope of internal auditing broadens, all levels of management tend to become increasingly aware of its contribution. Properly conducted internal audits provide management with invaluable assistance in operating a successful, profitable business.

In this sense, we are responsible for our own progress. Here are a few suggestions that have been helpful to me in securing the acceptance of management:

First, always try to assume the point of view of the top management to which an operation under audit reports. Conduct your audit as if you were the president, vice president, or the general manager of the division. The scope of your report should include the kinds of problem areas and activities they would like to investigate if only they had the opportunity and time for a detailed study. As an internal auditor you have both the time and opportunity. It's up to you to make the most of it by selling yourself and your objectives to all members of management.

Second, bend over backwards to be fair when you report your findings. Whenever operating personnel offer viewpoints they feel are important to your audit, do not hesitate to incorporate the changes they suggest in the draft of your report. However, nothing suggested by the local management should prevent your careful, objective reporting of any significant deviations regardless of the reasons offered in justification of questionable conditions. Frequently you must display a high degree of firmness, coupled with diplomacy, as you prepare your report. You must not distort the facts, yet you must be sure that varying points of view are fairly presented.

If all of us keep these suggestions in mind, I am confident that we will be able to eliminate many of the misunderstandings of which we have been victims in the past. And we will go a long way toward realizing the true potentialities of our profession.

CEDRIC C. SLAIN

AUTHORS AND ARTICLES

INTERNAL AUDIT AND MANAGERIAL EFFICIENCY

Management must evaluate itself in terms of its efficiency and effectiveness in the continual problems encountered in organization, finance and personnel; it must learn to take advantage of the available specialist services. This article discusses the relationship and coordination of internal auditing and the other major management services.

John Edward Wall, O.B.E., is Managing Director of Electric and Musical Industries Ltd. Prior to this, he was Director of Group Services in E.M.I., head of the Organization Division of Unilever Ltd., head of the Finance Department of Unilever Ltd. and Under-Secretary of the Ministry of Food.

COMMUNICATIONS—RAW MATERIAL OF THE OPERATIONAL AUDIT

The success of a decentralized organization depends greatly on whether information required for management is being transmitted quickly and accurately. Because of this, the auditor's appraisal of the channels of communication is vital. This article discusses the different types of communication systems and presents a picture of the auditor as an information analyst.

Felix Pomeranz is Assistant Chief Auditor of American Radiator and Standard Sanitary Corp., responsible for planning and conducting operational audits in the Eastern United States. Mr. Pomeranz is a graduate of City College of New York, has a Master of Science degree from Columbia University and holds a New York State C.P.A. certificate. He is a member of the American Institute of C.P.A.s and of the New York State Society of C.P.A.s.

THE WEDDING OF STATISTICAL SAMPLING AND EDP

The nuptials of statistical sampling and EDP are illustrated in this article by describing some simple applications of EDP to sample selection. Some of the basic concepts of statistical sampling are discussed together with consideration as to where and how this technique can be used by the internal auditor in conjunction with punched-card and electronic data processing.

R. Gene Brown is an Assistant Professor at the Harvard University Graduate School of Business Administration, a contributing editor of the Education and Training Department of the Journal of Accountancy, a consultant in Quality Control of the U. S. Air Force School of Logistics and a consultant in Statistics for Lybrand, Ross Bros. & Montgomery. Mr. Brown received his M.B.A. from the University of California and his Ph.D. degree from Ohio State University. He is a member of the American Institute of C.P.A.s, American Accounting Association and the California and Ohio Societies of C.P.A.s. Mr. Brown is a co-author with Dr. L. L. Vance of *Sampling Tables for Error Rates.*

INDUSTRY'S CHANGING CONDITIONS AND WHAT IS EXPECTED OF THE INTERNAL AUDITOR

The internal auditor must be prepared for the changes that the introduction of science to industry has brought in management's procedures and management's thinking. This article presents a United Kingdom point of view; and how these changes affect the internal auditor.

Reginald William Revans has been Professor of Industrial Administration and head of that Department in the University of Manchester since 1955. He holds B.S. and Ph.D. degrees, and was a Commonwealth Fund Fellow at the University of Michigan and a Research Fellow at Emmanual College. Prof. Revans was Director of Education for the Mining Association of Great Britain and the National Coal Board. He was working in Cavendish Laboratory as a research student at the time when that institution had nine men who either had won or later did win the Nobel Prize.

SELLING MODERN INTERNAL AUDITING

In present-day internal auditing, the techniques and procedures are the same as for auditing in the past, but the modern internal auditor's approach and objective have changed. In his work, judgment is the dominant factor —not mere mechanical knowhow. Modern internal auditing is sold by proving to management and to department heads that a competent and constructive job has been done in improving the operation of the company in the areas open to the auditor. Once this has been proven, further expansion of the auditor's duties is a logical development.

Bradford Cadmus is Managing Director of THE INSTITUTE OF INTERNAL AUDITORS. Before coming to THE INSTITUTE he had been assistant comptroller in charge of procedures and internal auditing at Standard Brands Inc. Mr. Cadmus was co-editor with Victor Z. Brink of *Internal*

Auditing in Industry and co-author with A. J. E. Child of *Internal Control Against Fraud and Waste.*

AUDITING CONTRACTORS' RECORDS

In auditing contractors' records, the government auditor must have training and experience in cost accounting. This technical article describes the procedures involved in auditing contracts placed by the Government.

Foster E. Hall has been in the service of the Federal Government for the past 18 years and is now Assistant Chief, U. S. Army Audit Agency, Office of Review and Evaluation. Prior to Government service, he was employed in managerial and accounting capacities with several companies. Mr. Hall attended Akron University, University of Michigan, the Army Command Management School and other Government executive training courses. He has written for professional magazines and is one of the authors of the *Contract Audit Manual* of the Department of Defense. Mr. Hall is a member of THE INSTITUTE OF INTERNAL AUDITORS, Federal Government Accountants Association and American Accounting Association.

INTERNAL AUDIT AND MANAGERIAL EFFICIENCY*

By J. E. WALL

Managing Director of Electric and Musical Industries Ltd.

IT would be tempting this evening to discuss why many internal auditors still seem to regard themselves as much misunderstood men and why, to the outsider, the profession does not yet appear to have resolved satisfactorily the problem of whether conflict can arise between the auditor performing the statutory duties and the auditor making a positive contribution to the improvement of managerial efficiency and effectiveness. But I will resist this temptation and in what follows I will take it for granted that among reasonable people there is no difficulty in reconciling the statutory duties of an auditor with his contribution to improving the efficiency of a business. However, it is perhaps worthwhile emphasizing that among those managers who see the internal auditor as a useful member of the team of people providing an increasing range of essential management services, do not, in any way, underestimate the importance of the internal auditor's management duties.

It is possibly too easy in these days, when new and exciting tools and techniques are becoming available to the progressive manager, to lose sight of such basic needs as an unremitting control over expenditure at source, an unequivocal statement of authorities and the constant check of activities against those authorities. The risk of management in the stratosphere is a real one and the auditor has an important part to play in bringing managers down to earth.

Further, the very growth in the size and complexity of the modern business organization raises acutely the problems of control. It is becoming increasingly difficult to reconcile adequate controls, both of a statutory nature and of performance against budget with that light touch which is so vital if big business is to remain lively and flexible.

What I would like to talk about this evening is, first, what must be done to improve the effectiveness and efficiency of management and then the role of the internal auditor as one of the "efficiency" services which is available to management and which the manager disregards at his peril. This

* Presented at the London Chapter. Reprinted with permission from *The Accountants Journal*, December 1960, p. 516.

problem of improving managerial efficiency is real and pressing and at times it is hard to avoid the conclusion that if some of the talk were replaced by action, top management of businesses would have less cause for alarm.

For it is an undeniable fact that it is likely to be a shortage of good management, rather than a shortage of other resources, which will restrain the steady growth of the United Kingdom economy as surely as it will restrict the growth of any company.

Industry and commerce in this country still seem to tackle the problem of the productivity of management and managers in too light-hearted a way. It is a fact that when the word "productivity" is used in British industry it refers only to factory workers or office workers. Rarely or never do we have a discussion of the productivity of management and the word "efficiency" must also be used with care if it is applied to managers. Techniques which are regarded as appropriate to increasing the output in the factory or office are rarely thought of as applying equally well to improving the output of all levels of management. It is true that the training and development of new managers is receiving much more attention, but it will take some time before the new supply is readily available. In the meantime, a still greater dividend can surely be obtained from improving the efficiency and effectiveness of the existing supply of managers.

It is worth pausing a moment to consider the reasons why managers are less efficient than they might be. One major problem is that selection, recruitment, development, promotion and placing of managers is still based primarily on narrow technical ability. Little regard is paid to the importance of ensuring that a manager is aware of the problems of personnel and organization and of finance, and unless the basic understanding is there, efficiency of management must suffer.

If you talk to any progressive manager about the problems of improving his efficiency he will almost certainly refer to the growth in the volume of paperwork which is so surely strangling business at the moment, and then to the wide range of daily problems which he has to face but which lie outside his technical ability. It is common for managers to grumble about the time they have to spend in dealing with problems of people and problems of organization, let alone the problems of finance.

In the meantime, however, an increasing range of specialist services are becoming available to managers to help them do their work better. The following list will be familiar to you since this kind of specialist services are

to be found in every large business and, for that matter, in a number of medium-sized businesses:

Personnel	Data Processing
Organization	Operations Research
O. & M.	Management Accounting
Works Study	Internal Audit

I should now like to consider each of these services briefly in terms of the contribution they can make to improving the efficiency and effectiveness of management, and then ask the question of how the last function I have mentioned "Internal Audit" fits in with the others? This latter point is important since there is a risk that a failure of co-ordination may lead us to make less good use of these services and in fact, may easily provoke conflict between staff and line which is so beloved to writers of textbooks on management.

I do not wish to understate the problem of these advisory services for management. Whether it is in theory optional upon the head of an operation to use the advisory services or whether he is bound to do so by company rules, the fact remains that unless the service is accepted willingly by the operator it has little or no chance of success. It is here that the internal auditor has a substantial advantage over the other advisory services. Most managers now have become accustomed to seeing the internal auditor around the place; he is almost part of the furniture and fittings. The need for his management duties has long been clearly understood and his presence is accepted in all parts of the business.

This is certainly not the case with other advisory services. Admittedly, this ready acceptance of the auditor in business can raise problems which I would like to deal with at greater length later on, but suffice it to say for the present that the auditor has the edge on his colleagues which he should be able to turn to good use.

The functions of both *personnel* and *organization* divisions in a business are surely well understood. The main task of the personnel division is to deal with people and of the organization division with their relationships, one with the other. It is quite obvious that these are, in fact, two sides of the same coin. The problems of people and organization can rarely be separated and I hope the day is coming where businesses generally will follow the happy example of the Civil Service which has always refused to separate the problems of personnel from the problems of organization. Now, in his daily work the internal auditor runs up against problems of people and organization. He is frequently in an exceptional position to form a judg-

ment about people and, indeed, may frequently see people at their worst. But I cannot hide the danger that if the auditor is to contribute to the work of the personnel or organization services of a business, he may run some considerable risk.

The essence of a good internal auditor is that he commands the confidence of the managers and the management. Managers must feel able to talk to him freely and in confidence—which must not be abused.

If an auditor is believed to be a carrier of tales his effectiveness may well be gravely damaged. I cannot easily judge how real this risk is. Some auditors have told me that it is vital that they must not pass on to others the views about people and organization which they have acquired in their daily duties. I find this hard to accept. All advisory services have to command the confidence as well as the respect of the managers they serve, but at the same time they have their obligations to the business. I will admit this is a very difficult field. But to set it at its lowest, some contact between internal auditor and personnel and organization divisions can bring advantage to both sides.

It must be clear that no auditor who is worth his salt can escape the problems of organization. Most of you will have found that in your review of systems, methods and procedures, it is organization which at the end of the day is causing the trouble and no change in these methods, procedures and systems will do good unless it is preceded by a frequently drastic change in organization. Whether the internal auditor should do more than report what he has found in the organization; whether he should go further and make recommendations for improvement are matters for argument. My own feeling is, and I feel this strongly, that a good auditor cannot be confined to reporting a state of poor organization, but must go further and attempt to diagnose the reasons and suggest improvements.

In my old Unilever job, for example, I was fortunate in having our chief internal auditor associated with a major organization study. It certainly did no harm to his status as chief internal auditor and he was able to make a deep contribution to the exercise.

With O. & M. on the other hand the internal auditor has always had a close association and I think the situation is gradually emerging that both internal auditors and O. & M. men are recognized as having much in common. It is, after all, to the difficulties of systems, methods and procedures that the internal auditor has so often to address himself. I know there is one school of thought which argues that if the internal auditor has a problem which calls for O. & M. treatment he should confine himself to stating the

problem and suggesting the O. & M. men be brought in. This same school says that if you encourage the internal auditor to put in new systems, procedures and methods it will raise difficulty in the future when these systems come up for review. Frankly, I accept none of these views. I see no reason why the internal auditor should not be asked to diagnose a methods problem and to suggest a new system. Perhaps the next review might be conducted by an O. & M. man, just as O. & M. itself could well be reviewed by internal audit from time to time. I see no problem at all on the continued close association of internal audit and O. & M. in all parts of a business.

This will have to come anyway. With the gradual mechanization of office work and, more particularly, the introduction of the computer as part of the office system, the internal auditor cannot escape a detailed understanding of O. & M. work.

I will not here attempt to discuss the problems which computers bring to the internal auditor. You know better than I do what you are up against and I can only be sorry for you. The auditor cannot run away from the problem, but the solutions are likely to come from hard experience rather than planned ideas.

The internal auditor has not often been associated with problems of *Works Study* particularly in the factory, but here I feel just as I feel about O. & M. A day will surely come when O. & M. and Works Study will be integrated as a single service to management and there can be much valuable interchange of personnel between the two sides. Unilever has already found this out to its great benefit, and it is equally true of E.M.I. The internal auditor must associate himself with the Work Study engineer, in the same way as he does with the O. & M. practitioner; in particular, he must watch out for the real risk that a whole mass of paperwork develops around the Works Study system, which is independent of the paperwork developed around the accounting system, and that never the twain shall meet.

I have already touched lightly upon the role of the internal auditor in relation to modern *data processing* systems.

The whole problem of what is loosely called *operations research* these days is one, I know, which many internal auditors regard with horror, although, in some businesses (here I can quote Unilever) internal audit has played a major pioneering role in the introduction of modern mathematical techniques into business decisions—the early work on linear programming for cattle foods, for example, in Unilever, was carried out by internal audit. It is clearly hopeless to expect the average internal auditor to be a top-

flight mathematician; on the other hand, if management is to make an increasing use, as I hope it will, of modern mathematical techniques to improve the quality of business decisions by quantifying some of the uncertainties, he must at least understand what it is all about.

Like O. & M., internal audit has been associated from an early stage with problems of *management accounting* and of ensuring a flow of better and more useful information to management. No internal auditor can fail to meet frequent cases in which the problem arises from information arriving too late, or excessive or ill-timed information. Fortunately, the auditor and the accountant appear to have found some way of living together. They are frequently drawn from the same school and both have regard for the importance of the basic statutory functions of good audit. To some people, however, the close association of accountant and auditor is a bad thing. It has been said to me often that the internal auditor should never report to the chief accountant. I must confess I do not understand this point of view, although I respect the fact that it is widely held.

There is clearly much that can be added to this brief description of the major management services and of the relationship of internal auditing to them. But I would like to finish by touching upon three additional problems which your profession has to tackle. The first is, what sort of person is the internal auditor of the future. If he is to associate himself properly with the new services which are available to management and, for that matter, if he is to be a pioneer in the introduction of these methods as he ought to be, he will indeed be a very special kind of person. He will have to cease to be a ticker of books, which is the popular concept of the auditor, and become *himself* a top-rate manager; in other words, the recruiting, training and development of the internal auditor of the future raises issues which I hope the profession is tackling seriously. This leads to my second point; if your profession does develop a race of auditors which is familiar with these new management services you will provide a splendid training ground for management.

In Unilever, the internal audit department has been regarded for some years as a source of good, young managers who can go into other parts of the business with adequate basic training. This, surely, is a sensible approach to the problem. It is probable that in future training of managers each of the management services will be regarded as an essential training ground for management. This is a hard doctrine, since it means that the management services must recruit and train far more people than they are allowed to keep. But it will make much easier in the future the difficult

problem of getting managers to accept these services as a method of improving their own efficiency.

My third problem is that some co-ordination machinery must hold these various services together and make sure that they make a comprehensive co-ordinated attack upon the problems of management efficiency. How can this best be done? We in E.M.I. have plunged straight into the deep end by bringing all of these services, apart from management accounting, under one single manager. Some of you, no doubt, will throw up your hands in horror at the thought that an internal audit department should report to somebody other than the board or its finance director, but I think you are wrong if you try to make internal audit a management service apart from the others. You will achieve only half of your objective. I realize that E.M.I. has taken a rather revolutionary attitude which others may be loathe to follow, but it is working out well and I believe that the business of the auditor has benefited from it.

Other methods of co-ordination are, of course, open, but I recommend to your attention the thought that simple forms of co-ordination are far preferable to a mass of co-ordinating committees.

COMMUNICATIONS — RAW MATERIAL OF THE OPERATIONAL AUDIT*

By FELIX POMERANZ

Assistant Chief Auditor, American Radiator & Standard Sanitary Corporation

INTRODUCTION

THE essence of good business management is the ability to make correct decisions and to make them quickly. We manage by exception. As long as a division is meeting its objectives . . . we leave it alone. If it starts to fall short, we look for ways in which headquarters can help." *Forbes* magazine recently attributed these words to the management of a decentralized industrial company.

The success of any decentralized enterprise is greatly affected by the networks of communication which link the segments of the company, and thereby facilitate centralized control. The auditor is vitally concerned with determining whether management has the information to discharge its responsibilities effectively. Therefore, the auditor must make a professional appraisal of the channels of communication through which the corporate will is expressed to lower echelons, and by which management information is transmitted upward. This objective is attained by applying operations auditing techniques.

The world has turned many a time since F. W. Taylor's treatises which revolutionized management doctrines. Yet it is only in our day that much of Taylor's philosophy—such as management by exception—has come to be applied to the control function. Operations auditing represents an important example of this trend.

The advent of operations auditing, to paraphrase Mr. Churchill, does not mark the beginning of the end for our profession, rather it denotes the end of the beginning. We are challenged to make positive contributions to future profits on a before-the-fact basis and have been given an incidental opportunity to advance the art of management in our companies.

My talk will emphasize the relationship of operations auditing to business communications and will include various examples illustrating operations auditing concepts.

* Presented at a Philadelphia Chapter meeting of THE INSTITUTE.

TYPES OF COMMUNICATION

Communications, in essence, means understanding; an apocryphal story, told of Mr. Khruschev, will illustrate the point:

A certain comrade had incurred the party's displeasure and Mr. Krushchev issued the necessary instructions: Pardon impossible, send to Siberia. Mrs. Khrushchev took pity on the victim and managed to make a slight change in the message: Pardon, impossible send to Siberia.

No doubt similar failures in communications have afflicted privately owned enterprises!

The operations auditor deals with four types of communication. First, information flows down the line of corporate authority to establish programs, plans, and policies; these matters generally are conveyed through organization charts, approved budgets, policy directives, manuals, etc. Usually the auditor will report on the degree of compliance with these management controls, and he obviously should be fully familiar with them prior to the start of any audit; this is especially important since auditors may be called upon by local management to advise in the implementation of higher echelon directives.

The auditor also has the duty of appraising the effectiveness of the controls and of contributing to their strengthening, or towards the establishment of new policies and practices wherever a need exists. Naturally, any findings which tend to cast adverse reflections on a higher headquarters should not be conveyed to a local operating unit, but should be reported separately, to preserve the corporate image.

Second, all operating units transmit information upward. Auditors always have been responsible for verifying the integrity, consistency, and accuracy of the data presented. The operations auditor, in addition, has the vital function of assessing whether the information is presented in such form that deviations from pre-established targets will automatically be signaled for management review and action.

Third, auditors are in constant communication with their supervisors, and with each other. Each auditor must have a clear understanding of what should be done, by whom, in what manner, and why. This can be accomplished effectively only by written instructions, and ultimately, by programming all routine and repetitive audit phases. (This represents, in effect, an application of the exception principle within an audit department.) Similarly, written record should be made of all significant instructions or conferences; "playing it by ear" holds many perils for auditors.

Fourth, the auditors are in continuous communication with other corporate personnel. The auditor must create a "climate" of mutual trust and goodwill, if he hopes to make significant and lasting contributions. For example, when staff specialists exercise functional jurisdiction in certain areas, the auditor should elicit the opinions of the staff men as to the subject matter of the audit. Staff specialists—and operating people, for that matter—will usually be eager to cooperate once they are "sold" on the advantages of the audit to their own job performance. The "cloak and dagger" approach on the other hand, will put the auditor in the position of Daniel in the lion's den—and probably with less felicitous results.

Whether the audit staff handles itself well in its relationships with others is determined primarily by the standards of staff selection, and only secondarily by the quality of audit supervision. Ability to communicate effectively, orally and in writing, should be a key factor in the screening of potential auditors.

Mention must be made of a form of communication bound to exert a decisive influence on the fate of any audit program—the report. Above all, the report should be prompt, terse, and written with the recipient (the responsible operating executive) in mind. Each report should be a complete "staff study" upon which management can base a decision or evaluation without additional research; objectives, assumptions, facts, interpretations, conclusions, and recommendations should be clearly defined; the accent should be on cost reductions and operating improvements. All reports should be discussed with the management of the unit under review prior to release; this is required by the principles of fair play, and also furnishes a modicum of protection to the auditor.

THE AUDITOR AS INFORMATION ANALYST

The internal auditor, by professional training, is equipped with an analytical approach, and with the detached attitude of the objective fact-finder. As an insider, he is familiar with his company's personnel, problems and history. The internal auditor enjoys a "birds-eye" vantage point for viewing the interrelated problems of the entire business; he may, therefore, be expected to develop the "big picture" insight required for an effective contribution to the solution of management's problems.

Since the operations auditor assesses the quality of management control information—and not the performance of personnel—it is not necessary that he be a qualified technician in all areas reviewed. When a need exists for engineering or other assistance, local management can generally be counted upon to furnish such aid.

The auditor's approach to a specific problem frequently can be formulated by reference to rudimentary principles of management. These were described by a distinguished soldier as follows:

"First, you have to establish an over-all goal or program. Then you prepare a specific plan to implement that program. While your plan is being carried out you need a watchdog system to inform you how you are progressing in relation to your plan. Finally, your completed plan should make available meaningful historical information to guide future planning."

The auditor is concerned with all aspects of management, the design of the plan, and the "pulses" which measure the plan's accomplishments in terms of cost, timeliness, and quality—but most of all with the communications system which implements the plan and which monitors adherence thereto by flagging deviations automatically.

The communications system must alert management to those departures from plans which require management action. The auditor not only assesses the effectiveness of the system, but must also correctly interpret symptoms which, in themselves, may reflect serious underlying problems. The balance of the discussion has been designed to bring out this diagnostic aspect of the operations auditor's work.

PRODUCTION CONTROL

Production control encompasses the supply and movement of materials and labor, machine utilization and related activities, so as to bring about economic manufacturing results in terms of quality, quantity, time and place.

The Plan—Sales Forecast

The production plan is usually based on, or influenced by, a sales forecast. Frequently, production is initiated automatically, when established inventory levels are breached; in such cases the forecast should be considered in computing the inventory limits.

Possible Audit Findings:

Sales forecasts not communicated to production control personnel.

Result: Schedulers will authorize production intuitively, or to meet customer order patterns; these methods may not be conducive either to balanced inventories or to economic production.

Sales forecasts not prepared in sufficient detail to be translated into a specific production plan.

Result: Schedulers will interpolate data on the basis of experience, which may be unrelated to anticipated market conditions.

Sales forecast changes not communicated in writing.

Result: (1) Some departments may continue to function under a superseded plan, thereby possibly creating inventory imbalances. (2) It may not be possible to reconstruct the sales forecast which was the basis of the production plan; hence, subsequent accomplishments will not be evaluated effectively.

The Plan—Inventory Levels

The determination of inventory levels calls for balancing minimum inventories against maximum production economies. Various other factors also must be considered, since their omission may have serious consequences.

Possible Audit Findings:

Unavailability of up-to-date vendor lead time information, or inadequate procurement lead time.

Result: (1) Parts not on hand when needed, consequent delays in production. (2) Delivery assumes paramount importance in vendor selection, superseding quality and price.

Economic production lots not known.

Result: Short-run production; machine setup charges spread over fewer pieces, involving higher cost per unit.

Value of past usage not considered or weighed incorrectly.

Result: Control effort expended on wrong inventory components; excessive inventories of one item, concurrent "stockouts" of another.

Warehouse space not known.

Result: Blockage of warehouse aisles inviting excessive handling; overflowing warehouses forcing production shutdowns.

The Plan—Capacity

The production schedule must be within the capabilities of men and machines from the aspects of cost and timeliness.

Possible Audit Findings:

Schedulers unaware of plant capacity in terms of product categories.

Result: Unrealistic production schedules; perpetual "emergencies;" uneconomical production due to machine setup "breaks;" delivery dates missed; backlog in excess of capacity over reasonable time period; loss of customer good will.

Standard times not established.

Result: (1) Machines may not be "loaded" properly, resulting in "bottlenecks" on some machines, idle capacities in other cases. (2) Difficult to preplan manpower needs effectively; high labor turnover; stabilization of indirect labor force at relatively high ratio in relation to direct labor; constant overtime at premium rates.

Implementation of the Plan

The company should have a control mechanism to insure that the assumptions made by the schedulers are pursued in production. Actual results should be compared continuously to the plan, and significant deviations from the target signalled immediately for management review and action.

Possible Audit Findings:

Machine routing not prescribed, or "alternate" routings not subject to managerial approval.

Result: Workers may select machines on the basis of individual preference regardless of cost per unit.

Foreman has latitude to transfer men between jobs and machines.

Result: Operations may not be performed by the individuals with the labor rates assumed in the production plan; deviations of actual costs from estimates or standards.

Foreman authorizes overtime on "spur of the moment."

Result: Overtime may become "normal."

Machine speeds not prescribed.

Result: Workers set own speed, regardless of standard speeds, or of speeds recommended by the makers of the machines.

Lack of expediting mechanism by which the status of each job could be determined without extensive "research."

Result: Delays not signalled for immediate action.

Inadequate reporting (*e.g.*, reports prepared too late for effective corrective action—reports do not follow lines of functional accountability—reports

prepared too infrequently—reports unintelligible to the individuals charged with taking corrective action).

Result: Proper action cannot be taken.

MAINTENANCE

Maintenance personnel are responsible for preventing breakdowns of production machinery, and for minimizing repair costs by conducting systematic inspection, lubrication and servicing activities.

The Plan

Each machine should be lubricated at intervals prescribed by the manufacturer of the machine. Repair cost experience on older machines should be weighed in relation to procurement of new machines.

Possible Audit Findings:

No formal preventive maintenance program.

Result: Management has no assurance that all required servicing will be performed in a timely manner; eventual breakdowns are likely.

Responsibility not clearly assigned for various phases of maintenance.

Result: Machine operators, foreman, and maintenance personnel may rely on one another to undertake the work—and usually little will be accomplished.

Lack of dispatch and control center.

Result: Maintenance men will complete assignments at their leisure and will then "drift" back for the next job.

Historical costs of maintenance tasks not accumulated, or standards not set up for maintenance operations.

Result: Lack of a gage by which the efficiency of maintenance labor could be evaluated.

Repair costs experienced for individual machines not summarized by machine category for periodic review by executives concerned with machine procurement.

Result: Economic justification for machine replacement may not be known.

Maintenance department's manning charts based on hypothetical peak workload, rather than on level workload.

Result: Idle maintenance labor, "make work" projects.

Implementation of the Plan

As the maintenance plan is carried out, the results should be evaluated continuously in terms of timeliness, quality and cost.

Possible Audit Findings:

Maintenance labor and material expenses charged directly to the production departments in which the work is performed.

Result: Destruction of functional accountability over maintenance expenses.

Maintenance men keep their own time records—not subject to verification by timekeepers or supervisors.

Result: Idle time may remain unreported, and "loading" of jobs would not be discovered easily.

Maintenance men do not complete any check list or similar device by the review of which management could be assured that all necessary work has been undertaken.

Result: (1) Uncertain quality of maintenance. (2) Maintenance men operate under a cloak of anonymity—a circumstance not conducive to maximum effort.

Expense of maintenance performed by company personnel is not evaluated against cost (and other factors) involved in buying from outside contractors.

Result: No assurance that maximum cost advantages are realized.

PLANT TOUR

Every operations audit includes a survey of physical facilities. One of the purposes of this survey is the identification of areas which appear to merit special attention—the approach follows the "management by exception" philosophy. The plant tour should be conducted by a member of the local manufacturing management and preferably will be routed in the same sequence as materials processed in production. During this tour the auditor could observe conditions which—perhaps because of their very obviousness—may have escaped the attention of local management; some possibilities are described in the succeeding paragraphs.

Materials Handling

Crane capacity normally should be adequate to lift the heaviest jobs. If this criterion is not met, assembly lines could be disrupted or workers forced into inefficient techniques.

An insufficient number of forklift trucks could lead to idle manpower ("waiting for job") or costly handling of materials. Conversely, idle forklift trucks may reflect disorganized procurement.

Bags of incoming materials frequently can be palletized to avert handling individual bags. Unavailability of large portable bins could lead to repeated handling of small containers.

Careless materials handling may be reflected by bottom pieces crushed through piling on excessive weight, by "leaning towers" of materials, or by forklift truck "chewmarks."

Traffic personnel may not be aware of the advantages of specialized freight cars introduced in recent years; for example, one type has "garage door" roll sides which make the interior of the car fully accessible to materials handling equipment.

The use of dump trucks in lieu of standard trucks, may lead to significant labor savings in unloading certain bulk commodities.

Warehouse Space

Identical items may be stored in several locations, inviting time consuming "searches" by stockhandlers. (The problem may be compounded by lack of bin labels, or unavailability of a central locator file.)

When materials are permitted to overflow from one location into adjoining aisles, rehandling will usually be required to free the blocked items.

Poor warehouse space utilization may indicate faulty preplanning by warehouse personnel, or inadequate notice to warehouse personnel of items to be expected by them; more significantly, warehouse space may not have received due consideration in production scheduling or in the setting of inventory limits.

When warehouses extend over several floors it is advantageous to minimize elevator loading and unloading by concentrating fast-moving finished units on one floor, near the shipping area.

Storage areas and shipping areas normally should be close together. The storage area should be sufficiently large to act as an effective "feeder" to the shipping docks without costly "backhauling" between storage areas.

Some merchandise can be stored uncartoned rather than cartoned, at a considerable space saving; any decision in this area will involve considerable study.

Shop Practices

For audit survey purposes sound shop practice means that materials will be available to workers without waste motion, and that unproductive expenditures of energy will be eliminated.

For instance, when large metal castings are to be ground, the pieces should be brought to the operator on a waist-high conveyor to avoid his stooping over; if the bottom of the casting is to be ground, the piece should be turned by means of a special holding fixture.

When small pieces are arranged on hangers preliminary to a plating or painting operation, the workers should use both hands in placing units, from top to bottom; hangers and pieces should be fed to the hanger crew by materials handlers.

The hangers should be fully loaded to avert plating or painting empty hangers.

Idle Men

Idle manpower may be attributable to weak foreman supervision, but also could be indicative of underlying production control deficiencies, *i.e.*, failure to assure the availability of the right materials, the right men, the right machines, the right tools, at the right time and in the right place.

Idle Machines

Machine idleness could stem from breakdowns in maintenance, inadequate machine loading mechanisms, poorly planned equipment purchases, obsolescence, or inability to "debug" new machines.

Paperwork

Materials can be moved from one machine or department to the next on the basis of verbal arrangements by foremen. However, lack of routing documents tends to make it difficult to achieve economical utilization of manpower and facilities, to say nothing of control over payments to piece-workers.

SUMMARY

Operational Auditing is a control device designed to make certain that management receives the information necessary to perform its functions

effectively. The flow of information is the sinews of management—the objective appraisal of communications therefore is the raw material of the operations audit.

Application of modern management techniques to internal auditing should point the way to significant cost reductions and operating improvements. In the final analysis contributions to profit are our best selling tool.

I hope that my talk will, in small measure, further operational auditing in your company.

CAN WE WED STATISTICAL SAMPLING AND EDP?*

By R. GENE BROWN

Assistant Professor, Harvard University Graduate School of Business Administration

FOR the invitation to speak to you today and for the opportunity to discuss one of my favorite subjects, I am truly grateful. In reciprocity, let me assure you at the outset that I shall not attempt a discussion of technical matters, be they electronic or statistical. Rather let us direct our attention to some of the general principles of each and see if the marriage suggested in the title of this paper can be properly and profitably consummated.

One thought in passing—it is always with some feeling of uncertainty that I agree to consider computer applications; uncertainty because technological progress is so rapid in this area that there is a great possibility that between the time of preparation and presentation of any paper such as this, some of the ideas could become obsolete. Even in my personal life I am left somewhat ill-at-ease by some of the mechanical advances which daily affect us.

I am reminded of the instances when I place a telephone call and connect with an electronic answering service. Somehow, this always tends to nonplus me. I am reluctant to hang up until the recorded voice is finished, and even then catch myself saying "Thank you," or "Goodbye."

If there are those among you who suffer in silence with me, I suggest we embark upon a three part program to counteract these mechanical marvels:

1. The next time you call a friend and get a recorded voice which drones, "Mr. Jones is not at home, if you care to leave a message please wait for the tone," say this in response: "Mr. Smith is calling Mr. Jones; Mr. Smith can be reached at MAin 1-1234. This is a recording." This will suggest to Jones that you have a machine which calls other machines.
2. Make a tape recording of a weather forecast and play it over the telephone to Jones' machine. This will suggest to him that *he* has a machine that calls other machines.
3. Finally, the next time you call and Jones answers in person, say this, "Hello Jones, this is Smith. Let me speak to your machine!"

* Presented at the Great Lakes Regional Conference of THE INSTITUTE.

Within a short period of time, a program such as this should do wonders for our confidence.

However, rather than trying to oppose the electronic world, let us see if we can join it. The title of this paper is purposely stated as a question, "Can we Wed Statistical Sampling and EDP?" There is some question in the minds of many auditors whether this can be done. Undoubtedly some of you have already attempted such a union, and undoubtedly also, with varied results. Throughout the audit process of reviewing internal controls and performing subsequent tests of actual accounting documents, there are many places where statistical sampling can be extremely helpful. On the other hand, there are probably more places where statistical sampling simply will not be of assistance. The same is true when we consider using statistical sampling in conjunction with a highly mechanized accounting system. Where it can be applied, there is a crying need for statistical sampling implemented through certain electronic machines. Where it cannot be applied, it is useless and wasteful to force such a "shotgun" wedding.

The answer to the question posed in the title is, then, "Yes." But this affirmative response is more nearly a "Yes, but, . . ." The more important question becomes, "When and how can statistical sampling and EDP be united for internal auditing purposes?" Prior to giving some rather specific answers to that question, I should like to discuss with you some of the basic concepts of statistical sampling. This is essential in order that we have a common vocabulary and maintain a certain thread of continuity and clarity in communication.

SAMPLING

To sample is to select something less than the whole mass from which the sample was taken. The objective of sampling is to obtain information about the whole mass without having to examine the mass itself. When we confirm receivables, the sample of receivables circularized is so designed as to yield information about all of the receivables. Some of the advantages of sampling are:

1. Reduced cost
2. Greater speed
3. Greater scope
4. Greater accuracy

Reduced cost and greater speed occur because of a less-than 100 per cent review of the total mass. Greater scope and accuracy are possible be-

cause of the use of more highly trained personnel or highly specialized equipment. In some situations, the volume of data itself precludes accuracy in a 100 per cent review. An excellent example of this is the pole inventory taken by telephone companies and the subsequent computation of amounts due the company from other parties for lines run on the telephone company poles on a joint-usage basis. Experience has shown that attempts at 100 per cent review in this case are uneconomical and less accurate than a properly designed sample.

STATISTICAL SAMPLING

Statistical sampling is sampling based on the mathematical theory of probabilities which states that a moderately large number of items taken at random from among a large mass are almost certain to contain the characteristics of the larger mass. Statistical sampling purports to assist the auditor in determining how many items to select, how to select those items in order to obtain a representative sample, and how to evaluate the results of the sampling process. Its appeal is primarily that of efficiency—it offers the auditor a basis by which he can feel certain to have secured sufficient information to provide a basis for forming his opinion and meeting professional standards and at the same time precludes doing so much sampling as to be inefficient. The law of diminishing returns works in sampling also. As more and more sample items are selected, less and less information is derived about the characteristics of the mass. In sampling your wife's new batch of fudge, for example, it takes only one bite to determine if the batch has been overcooked or not. Additional bites may yield more information, such as whether or not nuts are in the fudge, and if so, what kind, but successive samplings yield very little additional information.

Whether we are sampling fudge or inventory pricing, the principle remains the same; if we are attempting to secure information as to the quality of the mass, there is a certain level of sampling necessary to yield reliable data, beyond that it is not efficient (or prudent) to continue.

As can be imagined, statistical sampling procedures are somewhat more rigorous in application than any non-ordered approach. The principal steps involved in statistical sampling are the same as in intuitive sampling, but are required to be stated with more precision. These steps are:

1. A statement of the objectives of the sampling test.
2. Definition and delineation of the mass from which the sample is to be selected.

3. Definition of the sample unit.
4. Selection of the sample.
5. Interpretation and summary of the sampling process.

UNIVERSE

The universe is the mass from which the sample is to be selected. It is also called the population or lot. An interesting sidelight in this respect is that it is not necessary for the auditor to know the exact size of the universe. A reasonable approximation is usually sufficient. Occasionally the auditor can assume an infinite size. This is not as inefficient as might first appear. There is no linear relationship between the size of the universe and the size of the sample. For example, the following samples selected from the indicated universe sizes would yield the same accuracy in estimates of error rates at the same risk levels:[1]

Universe Size	*Sample Size*	*Sample Size as Percent of Universe Size*
1,000	314	31.4
5,000	418	8.4
10,000	436	4.4
25,000	448	1.8
50,000	452	.9
100,000	454	.5
Infinite	456	.....

Of greater significance to the auditor than the size of the universe is the homogeneity of the mass. The universe should be reasonably uniform throughout, both as to content and processing (*i.e.* administrative review and recording flow). Although this is often a difficult area in statistical applications, it is not as often a problem in auditing. The auditor and the statistician exclude items which do not belong to the same class or have materially different characteristics and make a special study of these. An example of this is the segregation from trade receivables of employees' accounts. These accounts are tested separately and not considered as a part of the universe of trade accounts.

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[1] The specifications for this sampling plan are: precision required ±2%, confidence 95%, and assumed maximum error of 5%. This table also demonstrates how unreliable are sampling plans based on "rule-of-thumb" percentages, such as 10% of all documents, 5% of all transactions, etc.

SAMPLE SIZE

The sample size is the number of items which is selected from the universe. It is computed mathematically based on the auditor's best judgment as to:

1. The objective of the sampling process
2. The accuracy required from the sample estimates
3. The risk which the auditor desires to assume
4. The variance existing in the universe

It is appropriate to mention at this point that the use of statistical sampling in no sense relieves the auditor from the use of his judgment. This is as remote an argument as the contention that computers remove the decision-making function from administrative management. Statistical sampling places renewed emphasis on the importance of judgment in auditing. In order to do a good job, an auditor must possess both technical proficiency and good judgment. The techniques of statistical sampling are additional tools available to the auditor. They increase his technical proficiency. The proper application of these technical tools depends almost wholly on the auditor's judgment. Regarding statistical sampling, the auditor must use his best judgment as to when and where it should be used; once that decision is made, the auditor must make two additional decisions requiring excellent judgment—the accuracy and risk required. It is completely fallacious to argue that statistical sampling takes judgment out of sampling or auditing. Technical proficiency and good judgment are interdependent, mutually strengthening and form the foundation for effective auditing.

RISK AND PRECISION

The concepts of risk and precision as they relate to probability sampling are somewhat difficult to define non-technically. Attempts at this are very often as incongruous as the plastic book-covers they sell in the university book stores which carry the bold title, *Brain Surgery—Self Taught.* Nevertheless, I shall try.

Every time we sample rather than examine 100 per cent of a mass, we are committed to accepting some degree of error in our estimates. Precision relates to the maximum probable error that can exist in our sample inference. One of the advantages claimed for statistical sampling is that precision can be measured. It is usually stated in a "plus or minus" percentage or dollar amount. For example, if in examining extensions on inventory pricing sheets the error rate disclosed in the sample was 3%, a statement of pre-

cision could appear as follows: 3% ± 1%. This would indicate that for this specific sampling plan that the probable error existing for all of the inventory extensions was between 2 and 4%.

Risk is a quantitative measure of the confidence which the auditor has that the sample inference as to precision is correct. For example, if the auditor were sampling under a plan which was designed at 95% confidence, this means that the risk assumed is one chance out of twenty that the error rate existent in the whole mass is outside the limits of precision specified. In the case above, there would be a 5% risk that the percentage of erroneous inventory extensions fell outside the range of 2 to 4%.

Another advantage of statistical sampling is that it is possible to measure risk for a given sampling plan. Even more important, it permits the auditor to fix both precision and risk at any desired level prior to starting his testing. I have often heard informally that one of the major functions of the auditor is the assumption of risk. If this is true, it would seem reasonable to desire to know or to determine what risk one were taking. To turn one's back on this information when it is available is a prime example of ostrich auditing. By hiding his head in the sand, the auditor knows not whether he did too much work, and thereby wasted his company's resources or did too little work and fell below professional standards as well as assumed too much risk.

More specifically, these and other advantages of statistical sampling can be summarized as follows:

1. An efficient and economical sample size for most sampling situations encountered by the auditor can be readily determined.
2. The auditor can specify the precision in the results that he desires.
3. The auditor can demonstrate to interested parties that the sample size drawn would result in a particular level of confidence in the conclusions.
4. Since sample size can often be determined prior to actual field work, audit time can be more accurately budgeted and controlled.
5. Often the total number of documents (and document numbers) subject to examination is known, or can be estimated prior to audit. If this is true, working papers for the succeeding audit can be prepared during slack periods or in the home office prior to travelling to other locations.

Many of the case studies published in the professional literature add emphasis to these arguments for the use of statistical sampling. These successful tests of statistical sampling have encouraged many to attempt implementation of such techniques in some of their own internal audits. Unfortunately, many auditors have come away from such tests slightly disenchanted with the idea of probability sampling. This disenchantment stems primarily from two problems: the first is the difficulty in understanding some of the "fancy Greek calculations" inherent in designing a proper statistical sample. Auditors cannot be blamed for a lack of enthusiasm for a technique for determining the amount of test-checking required if that technique is couched in terms foreign to auditing and which defy simple explanation. The second problem arises from a dissatisfaction with the great amount of time required to carry out the statistical test. This has especially been true of attempts at unrestricted random sampling using tables of random digits.

Fortunately, the availability of a reasonably sophisticated punched-card accounting system and/or an electronic data processing system provides relief from these two objections (or problems) which arise from attempts at application of statistical sampling. In what way can mechanical assistance be obtained?

Any approach to sampling can be discussed in terms of two problems:

1. The determination of the number of items to be selected
2. The selection of the individual units to make up that sample

If the internal auditor has at his disposal either punched-card accounting machines or a more complex computer service center, these problems can be largely solved.

DETERMINATION OF THE NUMBER TO BE SELECTED

The computation of sample size can be accomplished easily with a standard EDP program. This program can be pre-prepared and available for use each time a sample must be selected. There are three general methods of determining sample size; the one method selected will depend on the objective of the sampling process. For example, if the auditor desired to test effectiveness of internal controls or verify quality of clerical work he could use acceptance sampling; if he desired to test for fraud or clerical error he could use discovery sampling; if he desired to estimate dollar amounts of error or age of receivables, he could use survey (or estimation) sampling.

The computation of the appropriate sample size and the extent of sampling required will depend on which method is used. A program for the computation of each sample size can be prepared and used according to the direction of the auditor. However, it is somewhat unrealistic to tie-up expensive machine time to make these computations. Appropriate sampling tables have already been programmed and computed and are available. These tables are so extensive that almost every conceivable sampling problem encountered by the auditor can be approached through them. To start a do-it-yourself kit for the application of statistical sampling, the internal auditor might procure the sampling tables from the following sources:

Acceptance Sampling.—1. Harold F. Dodge and Harry G. Romig, *Sampling Inspection Tables,* John Wiley & Sons, New York, 1944. 2. Department of Defense, *Sampling Procedures & Tables for Inspection by Attributes,* MIL-STD-105B, Government Printing Office, Washington, D. C., 1959.

Discovery Sampling.—Headquarters, United States Air Force, Comptroller, Auditor General, Washington, D. C., *Manual for the Use of Statistical Sampling in Auditing,* 5 August 1959.

Estimation Sampling.—1. Same as Discovery Sampling. 2. R. Gene Brown and Lawrence L. Vance, *Sampling Tables for Error Rates and Other Proportions,* Berkeley, California, University of California Press, 1961.

The availability of the above tables precludes the necessity of computing sample sizes in the majority of cases. Because of this it is my conviction that the greatest assistance available to the auditor is the availability of mechanical equipment for *selecting the sample* rather than computing the sample size.

SELECTION OF THE SAMPLE

The selection of the sample is essentially a mechanical rather than a conceptual process. To perform it manually is inefficient, uneconomical, and as some auditors can attest, drudgery. The imposition of the requirements of random sampling for the selection of the sample adds to rather than detracts from this problem. In order that the requirements as to risk and accuracy set by the auditor be met, it is necessary that the sample be an unbiased one. This is usually accomplished in one of two ways:

1. Unrestricted random sampling
2. Systematic sampling with a random start

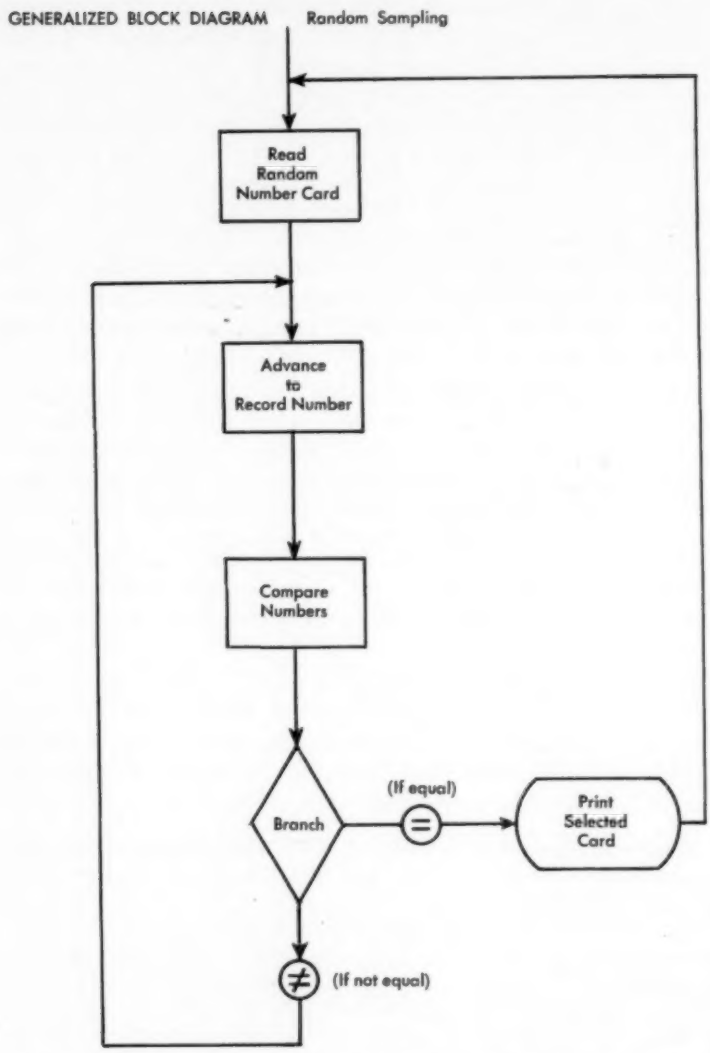
Both of these techniques for sample selection can be implemented with mechanized equipment.

Unrestricted random sampling makes use of a table of random digits. Random digits are merely a group of numbers which are random in order, that is, they have no demonstrable relationship between each other. It is not difficult to generate random numbers with a computer, but here again I feel a certain obligation to point out that extensive tables of random numbers have been generated, tested for randomness, and published. The Rand Corporation has published a book of one million random numbers. In addition, these numbers (in whole or in part) are available pre-punched on tabulating cards at minimal cost. To program and tie up costly computer time to create and test a "personalized" series of random numbers would seem uneconomical.

Making use of the available decks of random number cards to select a statistical sample is relatively easy. Following the philosophy of "use the equipment that will do the job at least cost" leads one to think first of a collater. If one were interested in selecting a random sample of 500 items from a universe of 10,000 items, the sample can be collated with the 500 random number cards with the appropriate number field selected, and printed in about 45 minutes. If this seems to be a slow operation I might point out that a recent similar job performed manually took three men two days. Of course, if one has the universe and random numbers stored on magnetic tape, the same job of sample selection can be performed in less than 4 minutes. Incidentally, this operation can easily be performed off-line with two tape units and thereby prevent tying up computer time.

A schematic diagram of the sample selection process using mechanized equipment is shown below. This simplified block diagram illustrates the steps performed in selecting a sample using random digits.

Systematic sampling with a random start is even more easy to apply. This technique is being used every day in auditing. The general idea is that the auditor will divide the size of the universe by the size of the sample desired and determine an appropriate fixed interval for sample selection. Referring to the earlier example, the 10,000 would be divided by 500 yielding an interval of 20 units. The auditor would then select every twentieth item for examination. The only restriction placed on this process is that the initial item be selected at random. The auditor can do this by writing the numbers 0 to 9 on slips of paper, placing these in a hat and drawing a number to select the first sample unit. Then he would add 20 to that number successively until all 500 items were selected.



Note: This diagram was prepared by David L. Smith, Data Processing Systems Engineer, International Business Machines, Columbus, Ohio.

One note of caution with respect to systematic sampling. It is absolutely necessary that there be no set sequential arrangement in the way in which the items in the universe are filed. Similarly, the auditor must be cautious that there is no relationship between the content of the documents and the document numbers. If this situation exists, the auditor would run the risk of sampling items only from the same class or category. Since the specifications of risk and accuracy are valid only when the sample selected is an unbiased one, systematic sampling must be used with extreme care.

Whether the equipment available to the auditor is simple or complex, mechanical or electronic, the implementation of systematic sampling is not difficult. The counting capacity of the equipment is used to insure the proper interval and select the sample. The primary job for the auditor is to see that the initial sample unit is selected at random and the counter(s) set to begin at that point.

SUMMARY

As you have probably gathered by now, these suggestions for "pairing-off" statistical sampling and EDP have been rather conservative. Is this stand justified? Any representative of the major producers of electronic computers can point out that a sophisticated system has the capacity for computation of sample size, generation of random numbers, selection of the sample, comparison of the sample units to pre-set standards and evaluation of sample results. To this argument I may only add "Amen." Unfortunately, the application of statistical techniques to auditing is still in its infancy. Here, as in any new area, we must walk before we run. A considerable amount of experience must be generated, promulgated and evaluated before auditors will be willing to go very far in turning over many of their testing processes to mechanical equipment. I feel that a completely integrated program of statistical sampling in internal auditing is several years away. It is best to build on the experience we now have in these areas. To force the issue, to over-extend our present capabilities would be similar to a recitation of the marriage vows while staring into the muzzle of a shotgun. Rather than that, let us start our wedlock in a more realistic (and relaxed) fashion through the more simple applications of EDP to sample selection which are outlined above for you.

WHAT MANAGEMENT EXPECTS OF THE INTERNAL AUDITOR

IN THE CHANGING CONDITIONS OF INDUSTRY*

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THE NATURE OF INDUSTRIAL CHANGE

Science as the Primary Agent of Change

WE have heard something of the impact that applied science is already making, and will continue to make with accelerating effect upon industry and commerce; how a technique, namely electronics, when decently married to a principle, namely, negative feedback, could, given imagination and confidence, be used to amplify the powers of the manager no less than those of the engineer. The growth of servo-mechanisms and high speed, high capacity computers for managerial as well as for technological control is, I suppose, regarded with especial wonder, if not, in some quarters, with positive dread, because it brings directly into the manager's office the biggest threat of change since the invention of double-entry bookkeeping in the year that Columbus discovered America.

Nor is it simply a threat of procedural change; it is, ultimately, a challenge to everything the manager does, even to the way he thinks. To the pure scientist, on the other hand, the growth of automatic data processing and thus of managerial control must take its place in what he regards as a perfectly logical sequence of scientific development, no more and no less spectacular than such purely technical advances as, say, radio-astronomy and moon rockets, or electron microscopes and streptomycin. For the industrial economy, to which we must give our attention today, is not characterized by threats of change in the office alone; it is in fact already changing in all its main technical aspects, machines and products, materials and processes, under the pressures of original scientific research and of development programs that have become essentially as scientific as anything carried out in a laboratory. Indeed, Britain, as the country that produced in Charles Babbage the first designer of a computing engine with a stored program, has been remarkably slow in making use of his ideas for managerial control. Nevertheless, the growth in the technical use of scientific ideas is particu-

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* Presented at the Blackpool Regional Conference of THE INSTITUTE, reprinted with permission from *The Accountant*, July 23, 1960, p. 109.

larly evident in Britain, if only because our economy is at present sharply divided between our old industries and our new, those dependent upon visible mechanical power, on the one hand, and those upon the invisible secrets of nature, on the other.

Britain as the Workshop of the World

The traditional wealth of Britain was first established in the eighteenth century, on coal, cast iron, textiles and pottery, and vastly amplified by the steam locomotive in the nineteenth century. But the marvels of 1760, which included the discovery of carbon steel and the foundation of Wedgwood's first factory at Burslem, owed nothing to science, even though Wedgwood was to become a Fellow of the Royal Society before he died. There was little enough industrial enthusiasm for science, indeed, even by 1860; our supremacy among the industrial nations of the world was still unchallenged, but, as a century before, our continuing success owed nothing to the support of theory or research.

Since we are meeting in Lancashire we can illustrate our point sufficiently by observing what, in 1860, the City of Leeds was doing for education in science; it held one class in chemistry, given in a cellar, by a teacher who was paid less than five shillings per week. Those who suspect me of Lancastrian bias may prefer to hear that John Dalton, whose atomic hypothesis had already won him a European reputation, was obliged to maintain himself by giving lessons at half a crown an hour while some Manchester manufacturers were, without the benefit of either science or education, making personal fortunes of a million pounds or more. It was in this essentially non-scientific—and not seldom antiscientific—tradition that our older industries were born, and those who have either worked in them or tried to arouse their interest in science as an aid to management, know that, although there are honorable exceptions, a few still bear the traces of it in 1960.

The Challenge of the New

But the pace today is no longer set by those with whom such spectacular success has lain in the past. Our modern, science-based industries are not only rapidly developing themselves and their associated technologies, but their technical influence is pervading all corners of our economy. The chemical industry, for example, is not only now selling for direct consumption thousands of products that it did not make twenty years ago because they were unknown to mankind, but it has become the basis of wholly new industries; this growth it owes to the research that it is conducting or in other words, to the amount of scientific thinking in which it is engaged. It has even created elements, like plutonium and neptunium, not known to exist in nature.

The same conclusions can be drawn from a study of the other great science-based industries, namely, electronics and oil refining; the contrast, as well as the historical lesson, can be driven home by observing what proportion of their present annual income is spent by the two groups of British industry upon research and development. The traditional ones, iron founding, machine tools, shipbuilding, textiles, coal and transport are all significantly less devoted to inquiry than are the newer ones: chemicals, electricity, aircraft and non-ferrous metals; whereas, for example, in 1955 chemicals and oil-refining each spent about 8 per cent on research and development, machine tools and shipbuilding spent hardly more than 1 per cent. This is, essentially, the difference between the first industrial revolution and the second, measured by that convenient financial scale, the percentage of total turnover.

The Contrast of Extravagance and Thrift

Yet there is a difference even more important than this between the two groups of industries. It is a difference in attitudes of mind; the traditional industries of Britain themselves created and grew up in an economy of abundance—abundant coal, abundant food, abundant foreign trade, abundant domestic servants, abundant families, abundant manpower, and abundant political influence. We were not concerned then with statistics of world trade. For success came through sheer force, often high-handedly employed; as our national symbol we adopted the lion, the King of Beasts. (Where, incidentally, does one see the British Lion most commonly today? Stamped on the subsidized British egg, painted on the obsolescent British locomotive.)

An economy of abundance can command abundant force and has little use, or even open contempt, for the subtleties of scientific thought. But the industries that owe their birth and their development to the growth of science think neither in terms of brute force nor of natural abundance; for example, the amount of plutonium available for study to the men who designed the isotope separation plant at Windscale was less than one-thousandth part of an ounce.

The newer industries are concerned with wholly different categories of human interest, with accurate measurement, with logical design, with verifiable experiment, with abstract theoretical argument, with scepticism towards established ideas and, above all, with a free and international exchange of ideas and experience. In their concern to understand what others may be doing they have no fear of disclosing what they may be doing themselves. Whereas the ascendancy of the first industrial revolution was displayed in its conspicuous waste, the triumphs of the second have

been recorded in their intelligent frugality; nothing is thrown away before it has been shown beyond all doubt that, in the present state of our knowledge, we can do nothing with it. Such an attitude of mind, athletic, inquiring, self-critical, cannot always remain imprisoned in the laboratory: it must eventually pervade the whole of the industrial organism and, once it has been recognized by the boardroom, management may come forward asking whether it has anything to offer those who make policy; we may even expect that it will assault those last bastions of reaction, the counting house and the treasury.

Those of you with a sense of history will remember that the House of Commons was burnt down in 1834 because of a fire among the tally sticks on which our national accounts were kept, whereas by 1834 not only had the railway started to replace the canal, but Charles Babbage had already designed his computing engine. Nevertheless, in spite of this somewhat hesitating start, I think we can assert with confidence that before we reach the year 2060, even the accountants of this country will be giving serious consideration to the scientific method.

Demands of our Present Economic Situation

I think, then, that we are able to identify, in the subtle influences of science, the primary source of the industrial change for which management and as part of management, the internal auditor, must ultimately be prepared.

But there is, within the British economy, a secondary force at work. In its effect upon management, as distinct from technology, it may be more important, in the short run, than the impact of science itself. For, despite all we are told to the contrary, our central economic problem is to make the most of what we have already got; we may, indeed, never have had it so good, but nobody would regard either the capital development program of the United Kingdom or its long-term prospects on the international market as other than highly speculative. For example, while the average annual rise in productivity in Britain over the past ten years has been well below 2 per cent, in the U.S.A. it has been over 3 per cent, and in the Common Market countries about 6 per cent; Britain's share of world trade has fallen from 22 per cent to 18 per cent, while Germany's has risen from 11 to 17 per cent. Our consequent need to do as much as we possibly can with our existing resources implies, of course, that the major responsibility lies with industrial management and with its technological and scientific advisers.

So great is this need and so clearly is it recognized, that we are now committed to a vast expansion of university education in technology and

science, since the one resource of which we can make a great deal more than we do at the moment—or have done in the past—is our national supply of intelligence. Fortunately, we can make fairly rapid progress in this quarter over the next generation and the future of professional education is full of encouragement.

Education of Management in Scientific Methods

I say professional education because I am thinking of something wider than the training of specialists such as chemists, physicists, communication engineers or statisticians. If science, with its rational parsimony, is going to be brought fully to our aid, then management must cease to regard it as a technique, or even as a set of techniques, merely to effect improvement in this particular quarter, economy in that, and change in another; management must regard the scientific method as it regards the English language, a medium not only for setting out its technical conclusions, but also one in which its own managerial thoughts are formed, developed and expressed.

Management must be no less analytical in what it aims to do, in how it plans to do it and in how it controls the doing of it than is the professional scientist whose services it employs. To understand how this is to be achieved and to see its relevance to the internal auditor, we must inquire, if only in general terms, what it is that managers do and will, in the future, increasingly be doing. I should like for this to quote from a recent report of the Carnegie Foundation of New York; it is called *The Education of American Business Men* and it has this to say (page 322):

> "The need for effective administration has been widely emphasized in recent years. It is related to the growing size and complexity of business in all its elements, to the greater need for conscious planning and control, to the growing difficulties of communication in large and complex organizations. Management must make decisions, but even more of its time and energy must go into getting the decisions (plans and policies) carried out effectively. . . . Unless recent trends are drastically reversed the status of the manager will become increasingly that of a co-ordinator of diverse interests and pulls in the modern firm and modern society, rather than that of the boss responsible only to the stockholders. This will mean a different framework for management decision making and decision implementation. It will mean new types of decisions and new ways of weighing the variables in making decisions and getting them implemented."

The Americans, as you are aware, have given a lot of thought and effort to the education of managers, and their views on these matters are entitled

to respect; the more so since they have now become critical of much in their existing programs and practices. What this quotation is making clear to us is the distinction that I have also been trying to draw between the two kinds of British industry: the massive empiricism of the coal and cast-iron age on the one hand, compared with the subtle analysis of our science-based economy on the other. Or the contrast can be put in terms of the American quotation I have just read: it is the boss and stockholder outlook, on the one hand, and the scientist weighing up his problems, on the other.

Management cannot afford to remain merely empirical, relying upon traditional practices, however successful, and its own powers to command, however authoritative; it must, like its technologists, recognize that it can command only after it has first learned to understand. The managerial bull of the nineteenth century is out of place in the china shop of the twentieth century; modern technology has achieved what it has, not by authority, but by an immense and sustained outburst of research and inquiry, to satisfy itself upon the nature of the forces that it is dealing with. It knows perfectly well that nature, in the form of the electron or the attraction of gravity, does not obey the scientist simply because he has a degree from Oxford, or indeed, even from Cambridge; nature obeys him because he has first taken the trouble to understand her. And this understanding has demanded that thousands of men of first-rate intelligence have given their whole lives to trying to do just this, often without thought for their own personal renown or fortune.

Science and Objectivity

But it has also demanded something more. It has demanded that any views, opinions, theories, hypotheses, experimental findings or other products of their thought and labor shall be openly published, and freely submitted to the critical examination of their fellows, of men no less qualified to judge the validity of what they say than those who first announce their new ideas or discoveries. It is this impartial, objective, unemotional, nonfinancial, disinterested reference of what is claimed by one man to the tribunal of all that is the essence of science and the sole cause of its ascendancy. It has no time for that which cannot be verified—even although the verification need not be complete, but only statistically significant. What manager would include among his good resolutions for 1961 some similar independent check on all he said and did? It is, of course, unthinkable. Any manager who did so would be regarded by the few as a lunatic and by all as an embarrassment.

But this remains the central paradox of the manager in the modern age. He who claims to observe the scientific spirit in what he does must not only not be afraid of criticism; he must go out of his way to invite it. This is merely respecting what is known as the control function of the manager, when he asks "Am I doing what I set out to do? Is my policy any good? Am I selling as many as I said I would? Is my quality up to standard? Am I keeping my delivery dates? Are my stock levels what they ought to be? Am I within my budget? Am I, in short, much good as a manager?"

A Biblical Illustration

It is interesting to note that the greatest manager of all time undertaking the greatest production schedule ever planned, namely, Almighty God creating the world, constantly subjected His achievements to such criticism. In the book of Genesis we read how God, having created light in verse 3, satisfied Himself that it was good in verse 4; in verse 10 He similarly satisfies Himself about the division of the waters from the dry land; in verse 12 about the quality of the grass herbs and trees; in verse 18 about the powers of the sun, moon and stars both to regulate time and to illuminate the sky; in verse 21 about the supply of whales and sea birds; in verse 25, about the living creatures of the earth, including cattle and the creeping things; and in verse 31 there is the final audit:

"God saw everything that He had made, and, behold, it was very good."

In these seven references, crowded into thirty-one short verses, we have, I suppose, the very earliest record of the fundamental quality of scientific management: to inquire whether what one has achieved is what one intended to achieve, or even to question whether what one has set out to achieve is worth achieving.

THE PROBLEMS OF MANAGEMENT CONTROL

Practical Problems of Control

Just as the disinterested test of one's theories is the power behind the scientific method, so does the control function of management provide the final criterion of its validity. A major problem among managers today is to develop improved methods of control, so that the effectiveness of their policies and the hindrances to their fulfilment can be known as clearly and as quickly as possible.

I am not suggesting that all we need is just more managers breathing down our necks, for no proverb is as true as "Never show a fool half-finished work." But we certainly need a better understanding of what is going on at the operating level, on the factory floor, at the coalface, in the

hospital ward or out in the field where the consumer makes his demands. We need better information systems; we need them to inform us on quite new aspects of our activities.

Suppose, for example, we were permitted to examine the stock control systems of a dozen large firms drawn at random. In how many of them would we expect to find an integrated system of control, based upon the logical optimization of total cost? Indeed, how many managements would know what the requirements of such a system ought to be, and, for example, with what information it should be supplied? I doubt if any single one of the twelve could examine the structure of its stock control system with the perception that its most junior chemist would bring to testing the quality of its standard purchases. Or which of them could both explain the system by which their machines were loaded and demonstrate that, within the present operating limits this was the most effective system that could be devised? These are not academic questions.

We are all aware of the trend towards higher manufacturing costs and longer delivery times visible all over British industry—even although the firms concerned have been able to suggest both their own prices and their own delivery dates; it is, in part, the explanation of our declining share of world trade. There is almost an inevitable law: jobs over a million pounds cost twice as much as was estimated and take twice as long to finish. These may be partly errors of forecasting or of speculation, but they are also errors of control. We need, generally, in British industry a better understanding of how to evaluate what we are doing; this is partly because we must improve our technical communications between planning and executing, but it is also because of a widespread failure to recognize the importance of the control function as such.

Of what use is it to talk in terms of computers, or even punched cards, if there is not only no logical system of control to attach the computer to in the first place, but no adequate recognition of the control function as a cardinal management responsibility? No doubt the availability of the computer will bring home these opportunities for improved control, but a parallel change in managerial outlook is no less necessary than the ironmongery itself.

Is the internal auditor already converted to the need? To what extent will he, as the man on the spot, feel able to ask the question, "Besides having done this job honestly and with proper authority, do you think it was a job worth doing?" Is he the right person, or one of the right persons, to help in the evaluation of what management is trying to do?

Control of Expenditure

There is, I suppose, a sense in which it is, or should be, improper to suggest that auditors, whether internal or external, do not control enough, since they spend their lives doing nothing else. But their control is, at present, of a very final form, perhaps too final, in the sense that the role of the criminal court is too final in exercising control over our behavior. As you are perhaps aware, one cannot elevate the tone of a nation's life by such activities as those of the prosecuting counsel alone; one must start much earlier.

Likewise, our need in industry is for more knowledge of how we are getting on long before the final day of reckoning arrives. To be satisfied, as the external auditor must be, that the firm has a watertight financial system and that it possesses the assets it claims to possess is one thing; to be satisfied, again, that this system is properly respected and that the internal auditors are doing their job is another; and to audit vouchers, to check their classification and to draw up periodic compilations under the prescribed heads of account is something else altogether. But all of these tell us only *part* of what we need to know.

We should inquire about our progress, our assets and our liabilities not merely to satisfy ourselves that everybody is keeping his fingers out of the till, nor that the stamps are being used for purposes other than sending off Friday's coupons. We need to know not only that the items held on the books of the company are still there, but also that they are being profitably used; we need to know not only that we are paying salaries to persons who in fact exist, but also that they are giving value for what they receive; we need to know not only that the value of our stocks and work in progress is such and such, but also for what reasons they stand at the levels they do and whether these could not profitably be reduced; we need to know not only that the bills we paid to such-and-such a customer for such-and-such supplies or services were in accordance with our authority to pay them and were properly receipted, but also whether the supplies or services were, firstly, worth what we paid for them, and secondly, necessary to the overall strategic policies of the firm.

What is more, we want to know all of this, and a great deal more, much sooner after the event than most costing systems now tell us.

Agents of Managerial Control

There is no doubt that, in theory, those who make and order policy should also be directly responsible for the control of it. But, as the extract from the Carnegie Report as well as our own experience show, the com-

plexity of modern industry demands that the total task be partitioned among independent specialists. The firm in which one man can personally direct and be responsible for all that goes on still, of course, exists; there are, for example, about 70,000 in the building trade alone, but these are hardly typical of our economy and will become increasingly less so.

Although the growth of control specialists has been fairly steady for over a century, since the first appointment of safety inspectors in coal-mines, there are still very large numbers of firms that have few systematic checks upon what they are doing other than through the audits of their accounts, both statutory and otherwise. Although the range of control specialists has been greatly extended since the appointment of mines and factory inspectors, or of ship surveyors for the mercantile marine, there is still little in the way of efficiency measurement in the majority of firms.

The three commonest forms of control, of most use to current management, are safety inspection, statistical quality control and standard costing; some sophisticated concerns have budgetary control, some have systems of sales control, some of inventory and stock control, and a few are provided with elaborate networks of instrumentation for measuring the consumption of physical entities like steam, electricity or compressed air.

Rise of Work Study and Operational Research

About ten years ago, as part of the general move towards raising the productivity of British industry, there began what has since proved to be a sustained interest in work study. This is hardly a system of control, although any examination of the tactics and processes of productivity, and in particular the contribution made to them by the workers, which is in general what work study pretends to be, must include recommendations to the management of the means whereby the success of any suggested changes may be judged. Work study is essentially a logical analysis of current productive processes, even although what is finally produced may be no more than a service, such as the issue of stores or the completion of records.

To the extent that work study is in fact logical, in that it inquires what the process is intended to achieve, analyzes the series of operations by which the achievement is secured and makes feasible recommendations for improvement, the collective activity may be called scientific, and the staff that prosecute it are entitled to a high and honorable place in the counsels of management. When, further, the subject expands its horizons and, under the name of operational research, begins to examine not only how certain lines of policy are carried out, but whether these are the lines of policy best

suited to the present resources of the firm, it has become a major organ of management. If the subject is pursued by men of ability the operational research unit may become nothing less than the general staff of the organization, advising the responsible management upon all its major moves, supporting all its advice upon a logical framework of observable fact and demonstrable possibility. It may be through the channels of operational research that the methods of science actually penetrate into the policy-making centers of the firm.

THE CONTRIBUTION OF THE INTERNAL AUDITOR

Source of Initiative

I have now said something about the long-term changes that are taking place in British industry, and something of the consequent stresses that are set up in the fabric of management. I must now suggest what kind of response all this should evoke from the internal auditors themselves. And may I begin this by suggesting that whatever part you are going to play will be largely determined, not by what management expects of you, but by what you can exhibit to the managers? In auditing, as in everything else, supply creates demand. It is the law of supply and demand, not of demand and supply; and if management, as I believe it to be, is now being pushed to the limit of its resources to keep abreast of its own problems, it has no time to sit down and work out what kind of salvation it would prefer to another. What management needs is ready-made help. Such help, if in evident supply, will also be in immediate demand.

My first point is, therefore, that, if your profession thinks it has anything to offer, it must take the initiative and offer it; it must not expect the approach to come from management.

Policy of The Institute of Internal Auditors

Your problem is, of course, to offer fresh help without ceasing to do what you are already doing. It will still be necessary to set one rogue to catch another; your relations with the external auditor and with the chief accountant will remain unchanged; decisions as to what shall be the audit program at any given time, or what the complementary agreement with the external auditor, will be taken as before. You will still have to see to it that the number of imprest accounts, or of points at which revenue is collected, are kept to the absolute minimum; there must always be independent safeguards when the money of a third party changes hands, and these safeguards must remain in your hands.

I think your place in the future depends upon your demonstrating that you can accept new responsibilities without resigning any of your present ones; in this I am not saying anything that is new, since you have said it already yourselves. I am quoting from a statement of your own Institute:

> "The internal auditor should be concerned with any phase of business activity wherein he can be of service to management. The attainment of this . . . should involve . . . reviewing and appraising the soundness, adequacy and application of accounting, financial and operating controls."

I believe this statement to embrace in a few words everything that I have been saying this morning. But in what way can an internal auditor review or appraise, for example, an operating control, say, for the sake of argument, the system of governing the amount of stock held in the finished goods warehouse? Or for distributing drugs, dressings and other supplies round the twenty wards of a hospital? Or for feeding 10,000 school children a day in some county borough in the West Riding? Let us look at some of these in detail.

Some Specific Illustrations

The value of industrial stocks of all kinds—materials, fuel, work in progress and finished goods—held in British industry at the end of December 1959 was estimated to be £4,796 million, measured at the 1954 value of the £. This is an increase of about 22 per cent over the value of the stocks held in December 1955, again measured in 1954 values. But while we were accumulating stocks at the rate of 5½ per cent per annum, our gross national product was rising by only 1.4 per cent per annum, namely, from £16,242 million in 1955 to £17,158 million in 1959, both incomes being measured at 1954 prices.

There may be some people to whom so great a rise in the stock level is a source of consolation. But business does not flourish by accumulating stocks; depreciation, storage, insurance, interest and so forth all have to be met. If we assume that the only holding costs are the interest charges, we see that the cost of keeping so vast an accumulation is about £1 million per working day. This is a tremendous sum of money, equivalent to about one shilling a day per wage-earner. Since there are charges other than interest, the cost is nearer two shillings. What is more, the stock level of British industry is rising four times as fast as the wealth that our economy is producing. And you all know that, since the whole is equal to the sum of the parts, the position of the average firm must be that of the nation as a whole. The daily cost of stocks alone probably exceeds the most magnificent

fraud that any of you could hope to detect in your entire professional careers. Is this not an example of where, in the words of your own Institute, there is scope for "reviewing and appraising the adequacy of operating controls?"

In my view, it most emphatically is. Before I suggest how, let me quote two further illustrations. An auditor of my acquaintance used to check vouchers for a firm that sold office requisites: typewriters, calculating machines, staplers, ribbons, adhesive tape and so forth. He had done this for several years and about 20,000 vouchers a year had to be sampled; two years ago, when the profitability of the firm came under question, it was discovered that such was the variety of items sold, and of the values of the individual orders, that on over 60 per cent of its transactions the firm was losing money. The cost of purchasing, holding, dispatching and invoicing three orders out of five was actually greater than the profit; on about one order out of five the invoicing cost alone was greater than the profit. How often does an audit prove that you are not being swindled and yet conceal your inevitable bankruptcy? Can any self-respecting internal auditor say that he is not concerned with these broader issues? He cannot escape them. Indeed, all known studies of the cost of producing or offering for sale the range of variety handled by most firms shows that at least 10 per cent are dead losses (not even loss leaders with supposed publicity value). Is this again not an ever-present opportunity for "reviewing and appraising the adequacy of operating controls?"

A third example within my experience should suffice. An economical domestic supervisor in a Lancashire hospital set out to save money by turning the sheets sides to middle after about four years' wear. A short study of what she was doing showed that the labor cost was almost twice as great as the value of the extra life that, on average, was expected from the rejuvenated sheet. Is this not another illustration of the need to appraise the operating controls? It may fall at a more humble level than the 12,000 invoices or the £1 million a day in interest charges on industrial stocks, but it is as good an example as I need to make my point.

You will, I hope, see that the contradictions of these three examples all arise because nobody concerned in each of them seems, as it were, to hold all the cards. The manufacturing superintendent presses for high stock levels as a safeguard against run-out risks; the sales manager wants to be able to offer any customer anything he may think of; the domestic supervisor feels only the professional pride of her office. Not one of them understands their situation in terms of managerial control, in terms of the total efficiency of the operation. Nor is this all. In the vast majority of firms there is no way

in which this synoptic view ever could be taken, short of the introduction of industrial consultants, the appointment of a work study officer or the establishment of a system of standard costing.

Freedom and Status of the Internal Auditor

I believe that this is the opportunity for the internal auditor. No other member of the staff is so well placed as he to do the job. By tradition he is free to inquire at all points of the undertaking; he sees the organization not only through the entries on an inventory or the figures on a ledger, but across the floor of the shops and through the eyes of the foreman. He has to know a lot—perhaps too much—about human nature; he is used to dealing with members of the firm over a wide range of levels, from the purchasing officer to the girl on the till in the canteen.

From the very range of his activities the internal auditor is less likely than any departmental specialist to believe that what is done cannot be improved upon; he certainly should find it easier to ask, not only himself, but also others, the reasons for such-and-such jobs to be done, not in this way nor in that, but to be done at all. If he has his wits about him he is already, of course, expected to notice whether three stores in the same factory are independently holding precisely the same article under at least three (often more) different-styled numbers. It is a big man who will then ask, not just why this is so, but why there need to be three stores at all. But this and nothing short of it is what is needed; it is no more than your declared policy made effective: "appraising the soundness of the operating controls. . . ."

I am aware that the proposal to elevate the internal auditor in this way will encounter resistance, or, more commonly, ridicule. It will be suggested that I am telling the ledger clerks to set up as economic advisers. This, I think, would not be a bad way of putting it. In the last few years we have seen the rate-fixers become the work study officers; in the last century, the barbers have climbed right to the top and become the surgeons. Every profession has to begin somewhere. Nor am I being just fanciful in what I am now suggesting. At least one very large local authority is sending to our college the whole of its internal audit staff for a three month's course in systems analysis and work sampling so that they may learn how to evaluate a process as well as know how to examine its financial records.

Additional Skills of the Internal Auditor

What are the main qualifications needed by the internal auditor to accept these new responsibilities? There is, of course, the basic need to

understand what the business is trying to do. Here I mean more than whether it is trying to make, say, bicycles rather than confectionery; all firms should have some overall manufacturing policy for example, to improve quality without increasing price, to expand output by intensive advertising or by improving service to the customer, to reduce variety by simplifying design and so forth. This should be known to anybody trying to exercise control within the firm.

The auditor should also be familiar with the main structure of the information services within the firm: who is supposed to know about what? And also with the managerial structure: who is supposed to make decisions about what? He needs these as an opening balance, so to speak, for an important part of his new job will be to suggest how information and decision should be better matched.

Then there are several purely technical needs, some of which he will no doubt possess already. He should, for example know something about statistics, or the science of variability; in particular, he needs to know the properties and use of samples, because, in a task so prone to boredom as checking a thousand vouchers, the likelihood of effective error is less in examining thoroughly a judicious selection of, say, 200 than in falling asleep over the lot.

Structure of Control Systems

A third need of the auditor is to understand the basic principles of method study; the concept of control demands that one shall know not only what the process under review is trying to achieve, but also its essential form or structure for achieving it. How does it all fit together? This is what method study is about, and the chief internal auditor of the local authority, to whom I have already referred, is right to ensure that his staff has mastered its principles.

Fourthly, there is what will come only with experience and further study: a facility to grasp the meaning of the form or structure of the process, to know what information is needed before one can pretend, in your Institute's own words, to "appraise the adequacy of the operating controls." For this, one must have friends in other departments: to bring stocks under control one needs, for example, four items of information that may be drawn from four different sources. One must know the holding cost, an estimate of the run-out cost, the pattern of variability in demand and the cost of placing a new order or of setting up for a new batch.

Here, I think, a good internal auditor has something in his favor: the difficulty of the work I am now describing lies not in the subtlety of calculation, but in the extreme reluctance of people to supply the primary facts—even if they know them. To induce people to become so fond of you that they positively fall over themselves to supply you with information is a piece of magic revealed only to internal auditors!

Some Modern Techniques

There are one or two quite modern developments in the science of managerial control of which, I think, we are going to hear a lot in the future. One is called the "learning curve," the other the "management ratio." The first depends upon a discovery made in America about the progressive increase in operating skill that comes with experience. Just as the world's mile record goes down and down, so the time (and thus the real cost) of a firm to make such-and-such a product should also go down over the years. When all outside changes have been allowed for, in costs of wages, raw materials, fuel and power, transport and so forth, the firm should still be lowering its own real costs as it learns to do the job better from year to year. The manufacture of a motor-car now consumes but one-tenth of the man-hours that it consumed in 1925, simply because the motor industry, like the milers, has learned a little with experience. It has now been shown that this progressive real improvement should be detectable everywhere in industry when the masking effects of other price changes can be allowed for, and any good control system should seek for it.

Another control device is the system of management ratios. A number of firms in the same industry agree to send to some central point—such as a federation of which they are all members—the ratios of certain key costs or values within their own firms; such ratios might be that of work in progress to finished stocks, or of annual turnover to capital employed, or of added value to total wages. These ratios must be distinguished from purely technical measures, such as the number of loaves made per sack of flour, or pounds of steam generated per ton of coal burned. It is the responsibility of the technical staff to have regard to these. About fifty management ratios throw useful light upon the logic of the firm's overall performance and if one knows these ratios for all the firms in one's own line (without, of course, needing to know which firms have which ratios), it is possible quickly to spot where one's own are departing from the general pattern.

Internal Auditor's Final Responsibility

There are, no doubt, other fundamental propositions in the theory of control of which internal auditors should be aware; it would be interesting

to prepare a syllabus of principles that could be presented free of mathematical sophistry. But it is not now my job to do this. It only remains for me to say that the internal auditor, in criticizing control systems (or drawing attention to a lack of them), must always preserve his independence—in so far as anybody can be independent when he is on the payroll. Whatever suggestions he may make for improving some particular system should naturally be based upon the most thorough analysis of the existing state of affairs; auditors are always expected to have some grasp of their subject-matter. But it cannot be the auditor's task to accept responsibility for operating the control, because it is important that he should still be free to criticize, not only the accuracy of the information that it employs, but also the use that is made of it.

The anti-scientific manager may find it fashionable to talk about his quality control system, but he might be embarrassed to have to act upon it if either he did not understand it or could not handle its practical implications. The mere existence of paper schemes, too, guarantees nothing but their cost and they may positively hinder a manager by unprofitably consuming his time. It is, moreover, often easier to start a control system than to maintain it; a control system, too, can be overdone, and the time arrive to get rid of it. The auditor must always remain free to point this out and to say this is to ask where he should be located in the management heirarchy.

In America, where most big firms are provided with a controller, an official of the rank of vice-president to see that the declared policies of the firm are in fact carried out, the place of the internal auditor is clear. There is also something to be said for separating him from the chief accountant where, at the moment, he is usually to be found. I am told that some people can grow to tolerate even accountants, but there should never be any suggestion of the internal auditor thinking that he has anything in common with them. He must, like the famous Cockerton, be free to criticize the accountant along with everybody else. Indeed, the real strength of the auditor's position should be this: that while in theory he is anybody's enemy, in practice he is everybody's friend. Perhaps he is most suitably attached to some small central unit like the office of the economics adviser, or of the assistant to the chairman. The point deserves more than a little thought if the declaration of your Institute is to become effective. And the more effective it becomes the more important will your location become, too.

SELLING MODERN INTERNAL AUDITING

By BRADFORD CADMUS
Managing Director, Institute of Internal Auditors

THE development of the techniques, practice and scope of internal auditing up to the present day has resulted in a product—modern internal auditing—that can be a real profit-making element in business. Yet there can be no question that many internal auditors find themselves so restricted in the scope and application of their work that there seems to be little or no opportunity to do much beyond protective auditing. The problem that we propose to discuss is how the internal auditor should go about selling modern internal auditing and its concepts.

Let's start with some thoughts about modern internal auditing. Just what is this product of ours? Certainly before we start to sell, we must be completely familiar with what we propose to sell. I am afraid that some auditors look over into the green pastures from which they are presently excluded and feel certain that they could do a great deal in these broader fields—with no very good idea of just why, or how this would be done.

One essential is that presently assigned fields be completely and competently taken care of before there is any thought of broader pastures. Otherwise, the auditor is like the cow that sticks its head through the fence to eat the grass in the next pasture with an untouched field of first class forage at her back.

Now to modern internal auditing. How is it different from any other internal auditing? This is a rather hard question to answer—since in many respects modern internal auditing is as much a state of mind as it is a group of specific techniques or procedures. Actually, the techniques of modern internal auditing are the old familiar ones that apply to any internal auditing. To be specific, they are:

1. Familiarization—with the objectives of the function being audited; the means by which these objectives are accomplished; and the controls established over the means of accomplishment.
2. Verification and testing—to determine the degree of compliance of actual practice with the planned procedures and other controls.
3. Appraisal—of such factors as the effectiveness of controls and the value of controls to the operation of the audited function.
4. Recommendation—for correction and, more importantly, improvement.

Any auditor performs these basic operations whether he is auditing the petty cash fund or the advertising department. So we cannot say that modern internal auditing means any great difference in techniques. Now let's talk about the state of mind.

For one thing, as an auditor broadens his work, he must accustom himself to dealing more and more with situations where judgment and opinions are the dominant factors—not mechanical accuracy. For example, if an account number on a voucher is mis-punched and a charge goes to an incorrect account, there has been a mistake. Everyone will admit there has been a mistake—there can be no argument about the fact of the error, or usually as to who was responsible for making it.

On the other side of the picture, let's suppose that an excessive quantity of sales promotion material is allotted to a particular office which does not dispose of it to customers and must eventually destroy a quantity at a large loss. Who was right—and who was wrong? Was it the employee who determined the allotment? Maybe he was right, but the sales office didn't try hard enough to dispose of it. Or maybe neither was at fault; the original idea may have been a bad one—and nobody could have disposed of it.

The auditor who ventures to take sides in such a situation is in for trouble —and he should be. For he will have wandered from his own field, which is the appraisal of the controls over the operation, into an area where he is pitting his judgment of the actual operation against that of the experts. What should he do? He should make sure that the established controls—such as records and reports—bring the situation to the attention of responsible management so that they know about it and can guard against a repetition. That is all the auditor should do.

It may well be argued that this same general approach should apply to internal auditing in the financial field. After all, responsibility for errors can be definitely assigned only when they are arithmetical in nature. As more of the arithmetic is taken over by machines, the internal auditor must concentrate on the controls over the machines and not the detailed mechanical operation—which is practically perfect.

From all of this, we propose that we consider that modern internal auditing is characterized by:

1. Emphasis on the examination and appraisal of the controls that operating management has established to govern its work.

2. Verification that established controls bring to management attention the good and the bad situations completely and impartially. This may be tested by the auditor himself by seeing how his private opinions work out in relation to the controls. If a situation which appears bad to the auditor is not revealed in the controls, maybe the controls are deficient—or maybe the auditor is wrong.

3. Looking at the controls from the viewpoint of those who are operating them.

There is nothing particularly new in all of this—it has been summarized just to be sure that we all agree on what our product is before we start to sell it.

The next step in our merchandising effort is to determine our customers. I am going to list these in what I think is the proper sequence—and here I'm sure that we will have some disagreement.

First—Operating department heads.
Second—Management.
Third—The business world.

I feel sure that many of you would put management first. Here we have to distinguish between management support and management being sold. Without question, the internal auditor must have management support before he ever starts his work. If he doesn't have this, he'd better quit. However, support by management does not mean that management is sold on what the internal auditor can accomplish. The sale comes when the auditor demonstrates through his work that he can make a constructive contribution to better departmental control. So that is why I put operating department heads first. If these men are not convinced that the internal auditor can be of help to them, they will be actively—or passively—against him. This feeling will be communicated to management. Management, of course, should and will be governed by its own knowledge of the particular individual who may be against the internal auditor.

It is not to be expected that every department head will be enthusiastic about internal auditing—but those who are enthusiastic should be in the majority and should include most of those who are well regarded by management. If almost everyone is against you—you'd better look out! Even those who don't like auditors should be willing to respect you as a square-shooter—as one who is not afraid to bring out the facts—on a complete and fair basis.

Now let's get down to selling. Here we might well learn a little from the sales departments in our own companies. They begin by studying the possible customers—what appeals to them?—How can the product be presented to be of greater appeal?—Once the customers have purchased, are they satisfied with what they've bought?

Sales and marketing research departments spend lots of time and money to study their markets and their products. I believe that far too many auditors operate on the "mousetrap" adage of Emerson, expecting the world to beat a path to their doors to clamor for the excellent product they have to offer. They are surprised and somewhat hurt that this doesn't happen.

STUDY THE CUSTOMER

The first step, therefore, is to study our customers—the operating department heads. We begin by trying to find out how they themselves control their operations. What standards do they set for deciding whether or not they are doing a good job? In most companies, some sort of standards will have been set by general management in the form of organizational structure, procedures, reports and budgets. In some cases, these will be accepted and used by operating departments without any major supplements of their own. In other cases, local management may feel that the prescribed controls are inadequate or over-elaborate or unsuitable for some other reason. When this happens, local management will usually run the prescribed system because it is told to do so—but then will supplement the prescribed system with its own private control structure that it considers better adapted to its needs.

It is important in our plan of studying the customer to find out what he considers the real essentials for his control. Every executive will have his own way of operating—his own way of looking at things; we must find out what this is.

Practically every supervisor will have some sort of a private "black book" that he uses to hold the records and reports that he thinks are really essential. Sometimes the "black book" will hold only company-prescribed records and reports; more often it will also hold some supplementary record that has been designed by the executive himself. It is not always easy to get a look at the "black book." When you can, a review and discussion of the reasons for the records—and of the way they are used—will be invaluable in showing how that executive thinks in exercising control over his piece of the company.

STUDY OUR PRODUCT

Now let's give a little thought to the product we are going to sell. By definition, the job of the internal auditor is the appraisal of control. Some narrow-minded auditors take this so literally that they give an entirely disproportionate amount of emphasis to examining and reporting on compliance with controls—with insufficient attention to appraisal of the real value of control. The result is a report that gives a recital of errors and omissions, without giving sufficient attention to the reason for the troubles. Maybe the real fault is that there is something wrong with the control itself —the errors and omissions are a symptom and not a disease.

The point we are trying to make here is that the product we have to sell is the control structure itself—our appraisal should be made with this in mind. We are going to examine and report on the operation of the controls from the standpoint of their value as tools which have been developed and applied by the operating department heads to control their operations. Those controls which are self-developed and applied will be those in which the operating heads are most interested. Additionally, there will be certain protective controls—such as those over a petty cash fund—which are imposed on all operating departments by company order. Very often, we will find less acceptance of these controls—and we may be somewhat on the defensive to justify them. We must have an explanation that will be reasonable and will make sense to the operating head. If it doesn't we may be sure that we will hear from him on each audit—until he reaches the point of respecting and understanding the reason for the control—or wins his point by getting it changed.

So let's define our product as a sound, effective control structure. This is what we have to sell. We want to be able to show the operating department head that our appraisal and recommendations for changes will help him to develop and maintain a straight-forward, efficient control plan to serve him in running his department.

MANUFACTURING THE PRODUCT

We have previously described the general techniques of internal auditing; they have been described in greater detail in many publications. To come back to our point that modern internal auditing is as much a state of mind as it is specific techniques, we present a number of things that may well be remembered in the course of making the product that we are going to sell.

1. We want to develop a custom-made product, which will be tailored to the specific situation. To carry out the comparison, everyone will

have a coat and pair of pants—but there will be no effort to make all customers fit into the same size and pattern—just so we can say things are according to standard. We will tailor our work to fit the individual situation.

2. We will be studying the operations and the related controls from two angles—first the service that is performed and the value that the controls have in helping the operating department to do its job better and more profitably. Second—the provision of adequate protection for the company's interests. I believe we must be very careful to approach our appraisal in this sequence if we are to tailor our finished product to fit the customer. If we start with the protective angle, it is hard to avoid becoming entangled with the innumerable standards, axiomatic principles and fetishes that have been built up over the years. By the time we wade through these, the constructive worth of the control is apt to be overlooked or very much minimized. To repeat, let's first see how much value the control has to the people doing the job—then make sure that the interests of the company are adequately protected.

3. As our work expands into operating departments, we must be constantly alert to the difference between fact and opinion. It is so easy to have ideas on how the other fellow does (or should have done) his job. After the results are in, it is often possible to see where a decision was wrong—where a different approach would have been much better. But second-guessing is not our business. What we want to do is to be sure that the controls showed up the wrong guess to those in a position to do something about it. If the controls did that, they were adequate—and that is as far as our appraisal should go. Being human, we'll have opinions as to the decisions that are made, but these are something that will be used to substantiate our judgment as to the effectiveness of the controls. We don't give out with them unless we're asked. In brief, we're very sure of our facts—and very reticent about our opinions—outside of our field of appraisal of control.

4. In our discussions with supervisors and employees, there are sure to have been comments, criticisms and suggestions on various points. We should be particularly sensitive to these. The mere fact of their being mentioned is an indication that the person bringing them up considers them of some importance. We should recognize the importance he attaches to them even though we may not think that he

has much of a point. We should give recognition to them in our work and our report—otherwise we are apt to be accused of evading an issue.

SELLING THE PRODUCT

We have now reached the objective of our whole job—which is to sell the product we have produced to the operating department heads who are to use it. Here we must try as hard as we can to put ourselves in the position of the customer. What will be of greatest appeal to him? Without much question, it will be something that will enable him to show better operating results in his work. For example, a saving in departmental operations, better service to customers or to the company, or better information in controlling departmental work. A change that will improve protective control, without doing anything else, may be agreed to—but it is almost certain that in popularity it will be close to the bottom of the list.

So our discussions with the operating head before the report is prepared and our closing meeting when the report is presented should be planned to give particular emphasis to those findings and recommendations in the fields that our customer is most interested in. This does not mean that we omit anything—it does mean that we stress those matters that we believe will be of greatest value in improving operating control of departmental work.

It is vital, of course, that we reach complete agreement on all factual material. Unless this is done, the result will be charge and countercharge—more like the discussions of Russia and the United States before the United Nations Security Council than like a constructive report. With the facts agreed upon, it is usually possible to agree upon a constructive solution. Where there is disagreement upon the solution, the facts provide a definite point and basis upon which an appeal may be made to higher management for decision.

In many cases, it is not necessary to get into an argument as to the constructive solution. We must assume that our operating head is a capable, intelligent executive who knows much more about how to operate his department than we do. Therefore, the principal thing that should be necessary is to point out deficiencies that our audit has disclosed in his own control structure. If this is done, then he will often take the initiative in recommending improvements. I can recall cases in my own experience where the department head became so preoccupied with more stringent controls that I spent my time arguing for less control—rather than more. One is particu-

larly apt to meet this situation when a fraud or a major error of some sort has occurred.

Next we should study the written report, which is the tangible product which will be looked at and studied (we hope) after we have gone to other assignments. In subject matter and presentation, we should make it of maximum appeal. In general, the report should follow the lines of the oral discussion. Almost invariably, briefness is a virtue that will be appreciated. So much excellent material has been published on report presentation that I shall say no more here. One last point, the report should appeal to the customer for what it is—a working document. It should look well—but not too beautiful. It should not look as if it had just been dredged up from the bottom of an outgoing file basket—neither should it look like the presentation of a proposed $10,000,000 advertising program to the Board of Directors.

SELLING MANAGEMENT

We previously talked of why we put management second in our schedule of sales effort. If we have done a good job in selling modern internal auditing to operating department heads—then the sale to management is easy. If we haven't sold operating heads—if most of them are lukewarm or antagonistic, then these sentiments will carry on to higher levels and we will find indifference from management and passive resistance in the department.

We don't sell modern internal auditing by kow-towing nor by arguing. We sell it by showing management and departments that we can make a real contribution to the better operation of the company. If we work as we must—without fear or favor—some people will like us, some will tolerate us—some may dislike us (these will often be those unsure ones who are basically afraid). Whatever the attitude may be—we must work and act so that all will respect us—as fair and competent analysts.

Most of the time, it will be found that management will be well sold once a competent and constructive job has been done in a few areas. After management has seen what can be done in the way of improving operations through better control it often happens that the internal auditor will be called upon to expand the scope of his work at a faster pace than he is prepared to. When this happens, you may be sure that there will be no worries about selling management on the value of internal auditing. This type of growth is well expressed in the saying "the reward of work well done is more work."

SELLING THE BUSINESS WORLD

When we come to the broader assignment of selling the business world, we will be successful only as we have built a base of selling to operating heads and to our own management. If we have satisfied customers there, the "word-of-mouth" endorsement that will result is the most effective selling there is. A "testimonial" from a satisfied customer is a wonderful opening wedge into new fields.

Anything that will give the business world a greater consciousness of internal auditing will be a positive sales factor. For example, working with educators on courses in internal auditing will make both educators and students more aware of what we have to offer—and that feeling will seep out and show up in unexpected places. Similarly, participation in some such activity as a public seminar on internal auditing or a talk to some other professional group will help in promoting more curiosity as to what we can do.

We must remember that—whether it be an article on internal auditing in "Purchasing Week"—a new course on internal auditing in New York University—or a seminar on internal auditing at the American Management Association—none of these in themselves will result in final "sales" of internal auditing to management. All that can be expected from these efforts is that they will bring a greater "awareness" of internal auditing. We want the management to say to itself—"There must be more to this internal auditing business than just a lot of figure checking. Maybe I'd better have another look at what we're doing."

The final sale will be clinched after the auditor, who has been given his chance, shows what he can do.

WHAT DOES THE INSTITUTE DO?

So far, we've talked almost entirely about what the internal auditor should do. You may rightfully think that THE INSTITUTE should be doing something on this selling job. We should—and we are.

Our biggest job is to help you on your job. Through chapter meetings, conferences, publications and research reports, we have the job of providing you with contacts and material that will help you keep up-to-date on the developments in our profession. We can't tell you what to do in your own job—but we can tell you what others are doing so that you may study it and adapt it for your own use.

One of the best testimonials I know to the value of this part of THE INSTITUTE's work came from one of our prominent members. He told me

that, as a matter of curiosity, he had compared the present internal auditing programs in his company with what had been done a number of years earlier. Rather to his surprise, he estimated that 70% of what they were now doing could be traced to ideas that came through THE INSTITUTE.

THE INSTITUTE has other jobs in selling. Working largely through chapters—but also directly—we try to increase the awareness of internal auditing in the educational field on the part of students and educators. We exchange our publications with about forty organizations throughout the world. Our international officers occasionally address other organizations on the topic of internal auditing.

TRAINING THE SALESMAN

When we are selling modern internal auditing, we are selling ideas. Any sales executive will tell you that ideas are the hardest possible thing to sell —and that consequently, the training of an idea salesman must be longer and more painstaking than is the training of a man who has only to open a sample case to show his wares.

Just as objectively as possible, we should analyze ourselves to see how well we are trained—since the training job is up to us. Are we up-to-date on latest developments? If the boss called us in tomorrow and said that we were to begin an immediate audit of the advertising department, would we be ready to do the kind of job that would be valuable to the department—the kind of job that would sell the advertising manager on the benefits of internal auditing?

In sequence, this idea of the necessity for training probably should have been back at the beginning of this paper. However, near the end is a good place for it—because you'll remember it. Before you try to sell modern internal auditing, be sure that you're ready to be a good salesman.

CONCLUSION

This has been a talk that is full of opinions. You may have agreed with some of them—I hope you have. You may have disagreed with others—and that's a good thing too. Actually whether we agree or disagree is not important—if the effect has been to get us thinking of ways that we can do a better job in selling modern internal auditing to operating departments, to management and to the business world.

We really have quite a sales staff—somewhat over 4,900 to be exact—since every member of THE INSTITUTE should be—and is—a salesman. If he does a good job in his company and his other contacts, he's a good salesman for our profession. If he does a poor job—we all are the losers.

THE AUDIT OF CONTRACTORS' RECORDS*

By FOSTER E. HALL

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THE audit of contract costs, which only a few years ago was the exclusive province of a few elite specialists, has now become a common assignment and a common problem to the Government auditor and the industrial internal auditor alike. Government operations have become so large and complex that the industrial, marketing, or construction firm or the educational or research institution that does not contract with the Government is in the minority. Government prime contractors in turn place subcontracts that frequently require auditing. Much commercial and industrial construction and research development and experimental work is procured by contracts of the type that should be audited. In the industrial community the task of auditing these contracts usually is assigned to the internal audit staff.

Internal auditors should know the extent of auditable contracts outplaced by their firms and have a voice in deciding whether they will be audited. This decision should be made by a professionally qualified auditor just as a decision as to whether a sick patient should be operated on should be made by a qualified surgeon.

If the internal auditor is not completely informed as to all contracts with audit connotations, a thorough review of the contract files during the next internal audit of the firm's procurement or purchasing office would seem in order. The too general lack of appreciation by procurement people of the need for, and value of, an audit of contract costs, and even outright resistance to such audits is sometimes difficult to understand. For example, an internal audit of a procurement office disclosed that out of 50 contracts reviewed, 26 were considered by the auditor to have required audit. The contracting officer had requested audit in only one case.

In general, an audit should be made in any case where the contract terms provide that compensation to the contractor is based in whole or part on the cost incurred, the quantity of work or service performed, the time element in performing the work or service or other variable factors. An audit of even a firm fixed-price contract may be indicated when such a contract is terminated or the scope of the work is changed so as to require a revision

* Presented at a meeting of the Washington Chapter of THE INSTITUTE.

of the contract amount. The question often arises as to whether the prime contractor or the Government should audit subcontractor costs. This should be decided soon after the prime contract is let by mutual agreement among the representatives of the prime contractor, the contracting officer and the cognizant Government audit agency.

Any auditor can make his task easier by establishing close working relations with his procurement people. He can often help keep them out of trouble by making pre-contract surveys of potential contractors or subcontractors, by arranging to get copies of all or certain agreed upon types of contracts, and by reviewing contracts for inclusion of necessary audit clauses, clear statements of reimbursement provisions, etc. Ambiguities can usually be corrected much more easily in the early stages of performance than after substantial costs have been incurred.

The auditor assigned to audit a contractor's costs should preferably have cost accounting training and experience.

The kinds of cost systems that a contract auditor will most usually encounter are: job cost, standard cost, processing cost systems, and no cost system. The latter is more often encountered than most accountants would imagine. Some of these systems will be tied into the general books and financial records. Others will be purely statistical and, therefore, less reliable.

The auditor assigned to the audit of contract costs will normally follow certain generally established practices; first, he will read the contract carefully—to establish the contractor's obligation, terms and conditions of payment, allowable costs, etc.

The auditor will next make a survey of the contractor's physical plant and accounting system to determine the acceptability of his accounting procedures, the effectiveness of his internal controls and the equity of his methods of assigning costs to contracts. The auditor will look for and expect to find a recognizable relationship of cost to the product or contract to which it is assigned.

Accounting practice has over the years developed concepts which have gained general acceptance. In the broadest sense these concepts recognize that (i) some costs are incurred for specific products, activities, or purposes, and (ii) other costs are incurred for joint objectives. Ultimately, the former emerges as direct costs, while the latter, in many cases, emerges as overhead or indirect costs. Another generally held and practiced concept holds that costs which benefit the current period only must be absorbed by current operations, while those that are incurred for the purpose of bene-

fiting future periods must be carried forward and amortized over the period of benefit. A third premise requires that the assignment of specific costs or groups of costs to a specific product, service or activity recognize the cause and effect relationship between the cost and the object charged.

The initial recognition, measurement, and classification of cost cannot even be attempted without adequate consideration of the purpose or object for which the cost was incurred.

It is true that some costs are incurred for joint objectives and the contribution that they make to each objective cannot be precisely measured; as a result they cannot be specifically assigned. The method of handling such situations will be discussed later. This principle, however, of matching cost and the object for which it was incurred is as applicable to costing contracts as it is to costing a contractor's commercial product. Thus, in evaluating the propriety of assigning a given element of cost to a specific product or service acquired under a contract, the auditor must satisfy himself that the cost assigned was incurred specifically or jointly for the benefit of the contract objective.

Upon completion of the survey of the contractor's accounting system, procedures, practices, and internal controls, the auditor will prepare an audit program. The program will be based on the contract terms and the auditor's survey findings. Audit effort will be channeled into areas believed most susceptible to findings, such as areas where the contractor's internal controls are weak.

The question of the best time to make the contract audit is of considerable importance. Usually, the sooner the better. In many cases it is advantageous to start even before the contract is let—with a pre-contract survey. As soon as the contract is let, a more complete survey of the contractor's accounting system should follow. Then, depending on the size of the contract, the acceptability of the contractor's costing procedures and the reliability of the contractor's internal checks and controls, frequent or even continuous audits should be carried on concurrently with the work under the contract. The economical use of materials, the accuracy of labor charges, and the allocability of certain burden center costs to the contract can only be determined while work is being performed. The auditor who waits until the contract is completed is dependent entirely upon records of cost allocation —and records may contain errors, intentionally or mistakenly. It is much better to get in, locate lack of control, sloppy workmanship, excessive and inefficient staffing, and other waste and inefficiency, if present, in time to obtain corrective action from the contractor and thus prevent the incurrence

of unnecessary costs, than to argue about the allowability of such costs after they are incurred.

All audit steps will normally be on a selected or statistical sampling basis and work papers will be prepared to record the scope of the auditor's investigation and analysis of accounts.

The audit of material costs is often considered to be the easiest classification of cost to verify. But this is true only as to verification of the fact that the material was purchased, delivered and accurately priced at cost price less all applicable discounts. The good contract auditor does not stop here; he will check bills of material, plans and specifications to determine that the material was actually needed for the job. He will check on usage factors to determine whether excess quantities were purchased or whether efficient production methods have enabled the contractor to divert supposedly needed material to other jobs. He will check waste and scrap losses for evidence of inefficiency and unnecessary rejections, and assure that the contract is credited with salvage values. When the contract is completed, the auditor will verify and check on the disposal of residual inventories and assure that the contract receives credit. In termination claims, physical verification of the existence of the inventory as claimed, its applicability to the terminated portion of the contract and the stage of completion of work in process, is very important since normally the entire termination claim is based on the inventory of material, work-in-process, tools and finished goods on hand at termination date.

Obviously not all auditors are competent to do all things. If the auditor needs help, he should ask for it—from his supervisor, inspectors, engineers, architects, lawyers or from any reliable source. It is better to verify an opinion and bolster a finding with expert advice than to guess and be embarrassed at the negotiation table.

The audit of labor billings is often limited to the verification of job tickets, payroll rates, extensions and labor distribution records. This is usually of little value unless floor and field checks have previously verified the actual presence of specific employees on the contract work. The floor and field check records should be checked against the labor costs charged to the contract and any variation checked out.

The auditor may find the contractor's overhead expenses grouped into one or more overhead pools and distributed through departmental or other burden centers and/or allocated to product lines, products or contracts on any number of bases. Direct labor dollars, direct labor hours, machine hours, cost of manufacturing, cost of production, and cost of sales are among the

frequently used bases of allocation. Space does not permit a discussion of the circumstances under which each may be considered equitable. The auditor should, however, satisfy himself as to the equity of the contractor's method of distribution. He will then selectively analyze and test the costs recorded in each account in the overhead pool for accuracy of cost and classification, for reasonableness, for acceptability to the period of the contract and for allowability under the contract terms.

If the amount or percentage of profit has been stated in the contract, the auditor's effort may be limited to verifying that the amount claimed is the amount authorized in the contract. If the amount of profit to be allowed is subject to negotiation, the auditor should include in his report any information which may aid his contracting officer or his firm's representative in negotiating a satisfactory profit factor. A comparison of contract profit requested with the firm's normal profit on commercial business based on invested capital has been found generally equitable and acceptable as a reliable guide.

Having completed his work, the contract auditor will discuss any questionable or problem areas with the contractor's representative to be sure that he is in possession of all the facts and will write his report. The report should in most cases be drafted on the job site. Invariably, the preparation of the draft report will raise questions that the auditor can readily check out if the contractor's records are at hand. If the auditor has returned to his distant office, he is often faced with a decision as to whether to leave the question unanswered or to make an expensive trip back to the contractor's plant.

The audit report may be in any format that suits its intended purpose. As a minimum, it should contain a statement of the costs claimed by the contractor, the amounts considered to be acceptable by the auditor and the amounts deemed unacceptable by the auditor. All unacceptable items should be very carefully explained for the benefit of the negotiator. The auditor's reasons for questioning each item of cost must be explained in terms understandable to the non-accountants who will probably make the final decisions. It is not enough for the auditor to make a statement to the effect that in his professional opinion the item of cost is unallowable. If he wants to make it stick, he must explain why it is unallowable; that is, it is excluded by contract terms, it is an unreasonable amount (and why), it is not properly allocable to the contract (and why), it is not applicable to the contract time period, etc.

The following four areas are those most generally neglected in the audit of contracts:

Contractual provisions
Floor and field checks
Physical verification of inventories
Explanation of costs questioned in the report.

It may come as a surprise to many readers that all of the aforementioned areas most frequently neglected by contract auditors would also appear on a list of the most sensitive and profitable areas of analysis of a contractor's records. Some of these are:

The Contract Terms. Complete familiarity with the contract terms, and all amendments thereto is absolutely necessary to any worthwhile audit of a contractor's claim. It may seem ridiculous to even think that anyone would attempt to determine the cost of a contract without knowing what was in that contract, but it is surprising how many auditors will try to do it.

Floor and Field Checks. It is easy for a contractor to write up phony time tickets, to change the job numbers or to charge the janitor and the wife's maid to the job as direct labor. Every seasoned contract auditor has had experience with all sorts of devices to inflate direct labor costs, which in turn carry their load of overhead and profit into an inflated billing price. The only real protection against an inflated payroll charge is frequent surprise floor checks of the production workers in the shop or on the construction site.

Physical Verification of Inventories. Few auditors want to get their hands dirty checking the physical existence and condition of book inventories, but if this supreme sacrifice can be made, it often pays off extremely well. Actual on-the-job verification on a selective basis, of the receipt, storage and protection of materials furnished for or charged to the contract, as well as frequent checks of usage to guard against waste and diversion to other uses, are highly recommended. Control and accounting for residual inventories at the completion of the contract should not be overlooked.

When a termination claim or a substantial specification change during production obsoletes tooling and inventory, contractors have been known to claim nonexistent material or to dust off all the work spoiled in process, rejected finished products, worn out tooling and obsolete material from their stock rooms and list it all as termination inventory. Only a careful check of the physical existence and stage of completion of the inventory and its applicability to the contract will reveal this situation.

Basis and Method of Overhead Allocation to the Contract and the Time Period Used. A careful analysis of the equity of the contractor's assignment

of overhead may pay off handsomely in terms of reductions in amounts claimed. Do not be swayed by arguments about consistency of treatment. The fact that a procedure has been consistently wrong for 100 years does not make it any more acceptable now.

Equity in the Circumstance is the Important Consideration. A firm may have been allocating factory overhead on the basis of direct labor dollars consistently since they started in business and for their own purposes found it satisfactory. However, if a specific contract is of such a nature as to employ only labor paid $4.50 an hour, whereas the average rate for the shop is $2.25 and hour, it is obvious that a labor *dollar* basis is inequitable to this contract in the circumstances.

Overhead Pool Accounts. Exactly what accounts should be analyzed most carefully will depend on the nature of the contractor's business and the terms of the particular contract. There are some areas, however, that will almost always merit attention. First, if the contractor charges directly to the contract any item of cost, such as travel expense or freight charges, which is normally charged to overhead, then all like items of expense should be screened out of the overhead pool since the contract will have borne directly its full share of such expenses.

"Interest" Expense. Most contractors with borrowings will try to work "interest" expense into contract costs, usually through one or more of the overhead pools. Most cost accountants agree that "interest" expense is not an acceptable contract cost on principle. While there can be no argument that in the broadest sense, elements, such as interest, are costs in that funds were expended; in the true sense, expenditures of this nature are a distribution of equity. They represent either voluntary acts or contractual obligations undertaken by management. Debt financing represents an act on the part of management designed to supply necessary capital. Within limits, it represents a choice between debt and equity financing. It may be done to secure greater leverage, prevent dilution of current control, or through just plain inability to float an equity issue. In any event, it is a price influence in the same sense as the earnings expected by stockholders. It represents a return on an investment to the owner of capital—not identified with the enterprise. Any consideration of interest expense, as cost rather than distribution of income, could result in serious inequities between contractors. For the same reason, if interest were to be recognized as an element of cost, the producer who choses or was able to finance his operations through equity capital would have a distinct cost advantage, and a pronounced profit disadvantage, over the producer who traditionally financed with debt.

The Auditor's Report. The report is the end product of the entire audit effort. It is often the auditor's sole means of communication with management and his only chance to "sell" his opinions. Many man months of diligent audit effort may be negated by an unconvincing presentation of findings in the report. The report should contain not only a clear expression of the auditor's findings, but also a patient, understandable statement of the reasons for these findings and opinions. A few extra hours spent on that report may avoid the complete loss of many days of audit effort.

An auditor frequently encounters obstacles in attempting to audit a contractor's records. Some of these are:

Confidential payrolls
Private ledgers
Proprietary secrets
Unrealistic management demands

What the individual auditor should do when faced with obstacles such as these will depend on the circumstances in each case. His first move should be to try to negotiate his way out of it by appealing to successively higher levels up to the president of the firm, if necessary. This approach is generally successful although there is no predicting at what level success might be attained, if at all. If the contractor persists, the auditor should then promptly report back to his department or company supervisors. They should then take steps to remove the obstacle. The amount of pressure that may be brought to bear on the contractor will vary with the contract terms and the circumstances in each case. If the contract has been properly drawn, all of the contractor's records will be open to the contract auditor without restriction. Otherwise, he cannot properly carry out his obligation to his employer.

It follows, of course, that the contractor who puts obstacles in the path of the auditor is taking a calculated risk. A hostile reception arouses suspicion in the auditor's mind and will probably cause him to dig deeper and be more critical than otherwise. The contractor who has nothing to hide will find it advantageous to meet the contract auditor with a cooperative attitude and to make all books and records readily available.

THE ROUND TABLE

Edited by JOHN T. REEVE

The interchange of ideas and experiences is a major factor in progress. Our theme for this year "Think Like the President" should stimulate the urge to share experiences where thinking like the president or other executive has paid dividends. These dividends could be in the form of new audit techniques or audit recommendations resulting from the revised viewpoint.

The thinking which you applied and which paid off could be the very thing one of your fellow auditors has been seeking without success. In sharing your experience, you will perhaps be putting it to work a second time, a third time, or many times. You may never know, but you can rest assured that you have contributed to the progress of our profession. And one day you yourself may reap the benefits of some other auditor's experience.

Therefore, your contributions to this department will be very much appreciated.

The Round Table
The Institute of Internal Auditors
120 Wall Street
New York 5, N. Y.

AUDITING ON YOUR FEET

During a period of extensive construction at a manufacturing plant location, the auditor was particularly interested in plant security. In discussion with the supervisor responsible for plant security, the auditor was informed that full cognizance had been given to protection of company property. The area under construction was enclosed with a fence, and a special gate was provided for contractors' employees to pass through. This gate was posted with a company guard.

The auditor checked the area to verify that the described measures were in effect. He also questioned the guard and found that he was fully aware of his duties which included checking the badges of people entering the area and also checking tool boxes, lunch boxes, etc., which were carried from the plant.

The auditor was nevertheless apprehensive of the situation when he observed the large number of contractors' employees. In discussing this point with the Security Supervisor, the latter stated casually that there were more contractors' men in the plant than company employees. What seemed inconsistent was that a staff of guards was maintained for the area used by the company employees but only a single guard was provided for the area under construction. The auditor made it a point to be at the gate at quitting time—a flood of men and vehicles approached the gate and passed through without giving the guard any opportunity to perform his duties. When this was brought to the attention of the Security Supervisor, action was taken to provide additional guards at critical periods so that proper security measures could be enforced.

Proper procedures may exist and everyone perform their assignments under normal conditions, but it is the unusual that the auditor must search out. By being on his feet, out in the plant, at the critical time, this auditor was in a position to observe a significant flaw in plant security measures.

Philadelphia Chapter

CREATION OF A TRAFFIC DEPARTMENT

Prior to auditing the shipping departments of the company's four divisions, Internal Audit had recommended a study be made to determine the desirability of forming a corporate Traffic Department. This suggestion was a result of audits of Purchasing and Receiving Departments. Management had not taken action to study this matter and each division was handling its own traffic problems, mainly through Shipping Department personnel.

One of the division controllers mentioned that his Traffic Manager (the only division that had such a position) was looking for additional responsibilities, because business at the division had hit a low point resulting, temporarily, in less demand on his time for traffic problems. Hearing of this, Internal Audit requested that the Traffic Manager be temporarily assigned to Internal Audit for a few days at a time when his work load allowed. Our request was granted.

This made available to us an individual with the technical "know-how" for our shipping audits. Also, because he did more traffic coordinating in his division than was being done elsewhere in the Company, we had him critically examine the relationship between Purchasing, Receiving, Shipping, and other departments regarding traffic problems in the divisions.

The results of this experiment can be summarized as follows:

1. Our audit comments were exceptionally "meaty," and well supported with technical examples our own staff would not have been aware of. Most of these comments were in the cost reduction area rather than strictly internal control.
2. We were able to present to management our study of why corporate traffic management was not only desirable but necessary, based upon areas of indicated savings such as: routing, choice of carriers, rate classifications, freight bill audits, consolidation of incoming and outgoing shipments, handling rush shipments, packaging materials, filing claims, ordering and completing forms, invoicing pre-paid transportation to customers, and coordinating inter-division travel and trucking.
3. Management was convinced. A corporate Traffic Department was created; and without necessitating additional personnel but by reassignment of duties of people within the company.
4. Internal Audit has learned the value of using technically trained people, even on a borrowed basis, to assist them in operational audits.

Southern New England Chapter

COMPANY CAFETERIAS

Internal auditors of companies that operate their own employee cafeterias should be ever-conscious of the fact that such operations often escape the company's normal internal controls and for this reason require special audit attention.

Some major points to keep in mind are:

1. The adequacy and effectiveness of the cash register controls; custody of reset keys.
2. Dual responsibility for sales and cash proceeds.
3. Independent verification of inventories.
4. Variations in the quantities of unsold food and whether such quantities are reasonable.
5. Regulations concerning sale of unused food to employees and controls on proceeds from same.

Our audit and appraisal of the operations of our six company cafeterias resulted not only in a tightening of controls, but also in improved income for both employer and employee, as follows:

a. Some of the cafeterias were open unofficially to sell doughnuts and coffee at break periods. Frequently the money received was not being rung up as sales were made, but accumulated in a cigar box and either rung up at the end of the day or every other day. Since our audit all sales are now registered as made; one area's daily break sales have trebled since this basic control was effected.

b. The company had been including a standard value for cafeteria employees' meals in their wages, and withholding federal tax thereon. Because of the employer's desire that they eat on the premises, and in fact the necessity of their so doing, we readily showed that the value of such meals was not taxable.

We shall not comment whether (a) more than offset (b) in the case of some employees.

St. Louis Chapter

CAR OR TRUCK SEAL VERIFICATION

The metallic seals which are fastened to doors of rail shipments, to doors of truck loads and also to valves of tank cars and trucks can function as a valuable auxiliary control, if properly utilized.

A product is not always weighed or counted at the time of its receipt. In many instances the only check made to determine if a conveyance has been broken open and some of its contents removed is the examination of the seal by a receiving clerk to insure that it is intact. No effort is made to verify that the number stamped on the seal corresponds with the seal number that appears on the shipper's invoice, notification of shipment, etc.

As there is a plenitude of metallic seals, an illegal entry into a car or a truck could be followed by the resealing of the conveyance with a seal bearing a different number. Therefore, the verification of the seal number at the time of receipt to the shipper's seal number would afford assurance that the conveyance had not been broken open in transit.

Chicago Chapter

AUDIT OF VOLUME DISCOUNTS

In 1956 a Supplier of equipment and spare parts granted a Customer a special volume discount at graduated rates, the highest rate attained during the year to apply to all of the purchases made during that year. On July 1,

1957, the Supplier introduced a volume discount policy applicable to all of his customers, the highest rate, namely 10%, to be given on a volume half as great as that that had prevailed in the special case. Payment of the discount was to be made after the close of the year, based on records maintained by the Supplier.

In March 1958, the Customer received a check for $13,000 supported by listings of invoice numbers and amounts representing his purchases for the previous year. As the Customer had not maintained records suitable for easy verification of the amount received, the internal auditors were invited to confirm its reasonableness. Checking was complicated by the fact that the Supplier delivered from various warehouses and the Customer paid at several accounting offices, so that documents were not centrally located.

Taking first things first, the auditors observed that the Supplier's supporting listings showed no evidence of comptometer check. When this was done, it was discovered that although purchases during the first six months of 1957 were listed, the total of those prior to July 1, 1957 was cut-off and excluded from the annual volume discount base. The Supplier immediately recognized that in computing the discount he had failed to give effect to the prior special agreement with the Customer and an additional discount payment of $9,500 was made with respect to 1957.

The auditors continued their review and concluded that in other respects, with minor exceptions, the Supplier's record was satisfactory for 1957. Upon reviewing purchases of the previous year, it was noted that had adequate control been maintained by the Customer and an additional purchase of $2,700 been made before the year end, a higher discount rate would have applied for the entire year's purchases and the extra amount recoverable would have been about $2,250.

After considering various corrective measures and alternative control methods, the internal auditors pointed out the probability that the Customer would reach the volume required for maximum discount every year. The Supplier then accepted the auditors' suggestion that in future a discount equivalent to the Supplier's maximum volume discount be applied to each invoice for equipment or parts sold to the Customer. Thus the need for special control records, and the labor they would involve, was eliminated.

G. L. M.
Caracas Chapter

READERS' PROBLEM CLINIC

Edited by ROBERT L. RICHMOND

Q. What are the major points which should be considered by an internal auditor in a first time review of his company's advertising expenditures?

A. In making a first time review of his company's advertising expenditures, the internal auditor should first determine what controls have been established over those expenditures. In most companies, an annual advertising budget approved by top management serves as authority for the expenditure of company funds for advertising. The budget will normally be prepared by the Advertising Manager and will show an allocation of the total appropriation by budget categories such as advertising agencies, advertising media, etc. The internal auditor should determine whether the procedures followed provide for a ready comparison of actual expenditures with the budget. Also he should determine whether significant deviations from the budget are being properly authorized.

Most companies retain advertising agencies to handle their advertising. The agency bills the company for the amounts it spends on the company's behalf, plus a fee which is usually based upon 15% of total expenditures. The billings should be supported by tear sheets from the newspapers and periodicals in which the advertisements appeared. The internal auditor should determine whether the billings for advertising expenditures are being checked adequately by a qualified employee in his company and are reviewed and approved by the Advertising Manager, or higher authority, before they are paid.

After reviewing and appraising the adequacy of the control procedures in his company, the internal auditor ought to determine whether those procedures are being followed properly. He should make tests of the work performed by the employees responsible for checking and approving the billings from the advertising agencies and others. The tests would include a determination that the billings have been approved at the proper level of authority, that the proper rates were paid for space in advertising media and for television or radio time, and that the services paid for were actually performed. The latter verification can be accomplished by reference to tear sheets, affidavits from television and radio stations, and the like.

In addition, the internal auditor should determine that expenditures for advertising are being recorded properly in the account provided for such expenditures.

Q. Should the auditor be held responsible for making recommendations in his audit reports as to the means by which the deficiencies reported should be corrected?

A. We believe that *whenever possible* the auditor should make *recommendations* as to possible corrective action on deficiencies which he reports. However, the auditor should make it clear that there may also be other ways in which appropriate corrective action might be taken. Also, management should be made aware that, even though an auditor's recommendation is put into effect, if it does not effectively correct the deficiency, the condition will be subject to criticism again in subsequent audit reports.

There will always be some cases in which the auditor may not be able to recommend suitable corrective action. For example, in some instances the auditor may not have the technical knowledge required to determine what corrective action can be taken; in other instances an extensive study may be required before the most desirable course of corrective action can be determined. In such cases the auditor may merely make a suggestion as to the manner in which the management responsible for the activities under audit might determine how to correct the reported deficiency.

Q. What part should the auditor play in the preparation of military contract termination claims?

A. Because we believe that the internal auditor's primary responsibility is to review the work performed by other organizations in his company in connection with the preparation of termination claims, we are of the opinion that he should not be made responsible for preparing his company's termination claims. However, we feel that it would be desirable to have the internal auditing staff review any large termination claims before submission to the Government.

Some of our members have found that they can do a much more effective and valuable job by making a concurrent review of their company's claim preparation activities starting soon after the receipt of the termination notice from the Government, rather than waiting until after the claim has been prepared. This is particularly true when large

quantities of inventory materials and work in process are affected by the termination.

By participating during the early stages, the auditor can make direct observations of the timeliness of the action taken to stop in-plant and outside production of the terminated articles and to cancel open purchase orders for materials and parts no longer required. Also he can make a concurrent review of activities such as the allocation of production costs between terminated work and continuing production, the screening of the termination inventories for items that can be diverted to other projects, the pricing of the termination inventories, and the recording of time spent on post termination activities. Deficiencies noted by the auditor, such as deviations from Government termination regulations or the use of improper methods for identifying or pricing terminated materials, can be brought to the attention of responsible management for immediate corrective action. A considerable time saving is often realized through detecting and correcting such deficiencies at the time they first occur rather than after the termination claim has been prepared.

STUDENT'S DEPARTMENT

Edited by A. J. PENZ

HIGHER EDUCATION AND THE INTERNAL AUDITOR

A recent survey of AACSB schools by Professor Reginald Rushing of the Texas Technological College revealed that out of 66 schools that responded, only 11 offered a course in internal auditing. At first glance it may appear that internal auditing is being neglected in the colleges and universities, but that is not the case. Certainly one course more or less cannot be decisive in a wide spectrum of knowledge, ability and skill needed by the internal auditor. Furthermore, it is quite possible that the basic auditing concepts, procedures, and techniques are included in the conventional auditing course or courses.

One may well ask, what should be the collegiate curricular content for the aspiring internal auditor? From a broad perspective, authorities are well agreed on professional business training on the one hand and general liberal arts training on the other. Whether the division between the two areas at the undergraduate level is on a ratio of 50-50, 60-40, or 40-60 really does not matter. The actual ratio in a given school depends on whether economics, monetary theory, or human relations are taught by the school of business or by the arts and science school.

For the internal auditor, accounting should have high priority. Much of the auditor's work is concerned with financial records, data, accounting control, and accounting procedures. Corporate finance, industrial organization, management, marketing, and business law make up the basic disciplines dominant in the business environment. Economics should round out the courses usually taught in the business school.

In the general education or liberal arts area, mathematics and statistics are indispensible to the internal auditor. Whatever other courses a student may elect, two areas are of utmost importance. John A. Spencer of General Electric writes in the *Michigan Business Review*, July 1960: "Needed: Ability to Communicate" and "Needed: Understanding of People." The fact that these two topics appear quite frequently on Institute programs is not a mere coincident. This fact indicates a deficiency. It is a vulnerable spot in the educational program, and it also calls for more and better in-service training.

Most collegiate business administration programs include two courses of English composition and one course in literature. These courses are generally taught by the English department. Also included are a course of business correspondence and one course in research report writing. These latter courses might be taught in either school. The point, however, is that in spite of this array of academic course work in English, graduates are still found deficient in communication as evidenced by much criticism.

Are these criticisms realistic? An internal audit report is not acceptable or reflects on the writer if it has but one flaw. In school such a report might still be rated "B" on a scale that ranges from "D" to "A," assuming "A" as excellent or perfect. The other grades reflect a tolerance of various degrees of imperfection. Initially the "C" student can be expected to render an average but not a perfect report. It seems perfection will have to be achieved on the job through life-long practice. Grady Fullerton, Comptroller of the City of Birmingham, Alabama, stated at the recent Southeastern Regional Conference: "To write well, one should steep himself in good literature."

Understanding of people, human relations, or behavioral sciences is a topic that receives more and more attention in business administration in general and internal auditing in particular. One of the seminars at the above mentioned meeting was devoted to this topic. This ability or trait needs daily nurture and cultivation but a good foundation upon which to build should include a course or two in psychology followed by applied psychology and human relations.

Since the internal audit function is differentiated from the line at the upper level of the organization structure, the auditor's effectiveness depends on many skills and thorough knowledge of the basic business functions. Hence the academic preparation should encompass accounting, finance, management, marketing, and law. Economics, mathematics, and statistics broaden the base while selected courses in arts and science should include a good sequence of English and behavioral science. If a course of internal auditing is included in a program as outlined, so much the better; but it cannot be said that the program is lacking if the specialized course is not offered.

INTERNAL AUDITING AT FOOTE MINERAL COMPANY*

By ARCHIE McGHEE
Internal Auditor, Foote Mineral Co.

The author may well be called the trail blazer for internal auditing in his company. It is a refreshing, first-person account of the problems the auditor encountered in selling the function to the firm and subsequently to various echelons of authority. The novel technique used to effect corrective action may be found helpful under other circumstances.

FOOTE Mineral Company was founded in 1875 and incorporated under Pennsylvania statute in 1916. Foote has been a pioneer in the development of zirconium and lithium, two of the lesser known metals. Today its principal products are electrolytic manganese, used in stainless steel; processed minerals and ferro alloys for the welding rod industry; and lithium chemicals for the ceramic, grease, and chemical industries. Foote has plants in Pennsylvania, Virginia, North Carolina, and Tennessee.

I am the only full time internal auditor at Foote. I was hired in late 1951, but full time internal auditing did not start until 1955. Always there were special studies, rush jobs, and all sorts of distractions to occupy the internal auditor's time. However, aided by comments from our public auditors and by a sympathetic member of the board, internal auditing was launched on a full time basis in 1955.

The next few years were a struggle for acceptance, but acceptance finally came. In retrospect, let us examine some of the reasons for audit acceptance.

Throughout our programs we have always tried to maintain a proper perspective. Two questions guided our steps. First, how important is a finding with relation to the whole; and second, who can do something about it? Why belabor a subordinate with critical comment about something he cannot control? Or, conversely, why burden an executive with details resolvable at a lower level? Keep the proper perspective and you'll do much to destroy the auditor stereotype of yesteryear.

In auditing at Foote we put a high value on human dignity. When a mistake is made, it is treated as a mistake. We all err; so use some tact. It

* Presented at a meeting of the Philadelphia Chapter of THE INSTITUTE.

is an art to say the right thing at the right time. Tact has won us friends, in spite of criticism.

Fair treatment of the audited was another step toward acceptance. At the conclusion of a plant examination, each department head audited is asked to attend a conference when the Plant Manager is exposed to the audit findings for the first time. This has proven very beneficial, primarily because:

1. The department head audited hears first-hand the story given to his boss.
2. The department head has the chance to rationalize or defend his position on any finding.
3. Corrective action can be discussed and started before the issuance of a formal report.

As a further step in the pursuit of fair treatment, we use the same general program at each plant. So that each department head knows while he occupies the hot seat, sooner or later his counterpart at another plant will get the same exposure. Responsible supervisors like fair treatment, so we welcome them to our reviews and give to each department audited the same conscientious scrutiny.

Finally, when the audit is complete we try to make our report a salable product. For immediate attractiveness an eye-catching binder is used. Fronting each report is a highlight page aimed at the busy reader. Here on one page he can get the main findings in capsule form. Detailed comments are contained in the body of the report that follows. A separate section of the report is used for comments on each area audited. Findings are numbered and listed in order of importance, with the most important first.

Foote management has now accepted internal auditing to the extent that they now require an answer to every comment in the report. Consequently, at the end of each section a list of suggested respondents is provided. Having the findings numbered pinpoints responsibility for answers. For example, in an audit of the Plant Purchasing and Traffic, the Purchasing Agent might be asked to answer Findings Nos. 1, 3, 4, and 6, the Plant Manager, Finding No. 2, and the Traffic Manager Finding No. 5. Copies

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ARCHIE McGHEE *is Manager of Accounting and Chief Internal Auditor of the Foote Mineral Company. He is a graduate of the Wharton School of the University of Pennsylvania, a past president of the Philadelphia Chapter of The Institute of Internal Auditors and a member of the National Association of Accountants.*

of answers are sent to the Internal Auditor. Old audit reports and the respondents' answers are invaluable tools when preparing future audit programs.

Internal auditing has been accepted at Foote, but that is not a signal for relaxation of effort. It is like an experience of Charles Schwab when working for Andrew Carnegie. On one occasion, Schwab wired his chief: "All records broken yesterday." In reply, Carnegie telegraphed: "Congratulations! What have you done today?"

One of the earliest problems met by a one-man audit staff is the need for assistance. I tried preparing my workpapers in advance; reviewing purchase order copies before arriving at the audit site, and using local personnel to pull vouchers, contracts, and other documents to be examined. These moves helped, but they were not sufficient.

Our most successful solution involves the borrowing of a man from another location. For example, at our Kings Mountain, N. C. site we have both a Plant Accountant and an Assistant Plant Accountant. On a recent audit of our Knoxville operation, the Assistant Plant Accountant from Kings Mountain was invited to participate. We feel this scheme has several advantages:

1. It provides accounting-minded assistance during actual audit, especially for such time-consuming jobs as the testing of stores.
2. It provides an excellent training medium. By recognizing shortcomings in the operation audited, the aide is better prepared to evaluate his own function.
3. It provides an opportunity to appraise the work of understudies.
4. It improves communications. The Assistant has the opportunity to meet those he has already contacted by phone, and by correspondence.
5. It demonstrates the impartiality of the audit program. By watching another operation being subjected to the same kind of audit, which he has experienced, the Assistant knows all divisions are treated alike.

It is true this scheme has the disadvantage of exposing the audit program to one who will be subject to audit. However, we believe the advantages far outweigh this disadvantage.

It has been requested that we describe some innovations used in our practice. In Foote the invoice approval procedure starts in the Purchasing

Department, where purchase order terms and quality are matched with the invoice. Accounting is responsible for matching receiving report quantities. Twice I tested the care given this matching. Each time with the same result.

Approaching the Purchasing Agent on the first day of my audit I asked if about half dozen legitimate receiving reports could be extracted, and ridiculous dummies put in their places. For example, on a purchase of 500 units the dummy receiving report was made out for 12; another for 6 units was inflated to 98. Just before concluding the audit, I went searching for my fixes. One had been paid, and all the rest were properly approved, ready for payment.

An underhanded trick, yes—I admitted this to the department head and his boss, but it certainly proved a point.

In one of our Knoxville plants we had a very unhealthy sanitary condition. In addition, the general housekeeping was poor. It was reported to the best of my ability in several audits, but nothing was done. On one occasion our head of Industrial Relations even threatened to bring in the Tennessee Board of Health, but still nothing was done. Seeing the familiar sights on my next audit, I procured a photographer, explained my purpose, and left him free to capture the story. We looked at the pictures during our verbal presentation to the Plant Manager. He admitted they weren't pretty, but dismissed them without comment.

Returning to the office about a half-hour early the following day, I found the President alone in his office. Certainly he always had time to look at a few pictures. One by one he turned them over. "Where were these taken and when?" I told him. "You mean we have employees using facilities like this?" "Yes, sir." "Pardon me a moment." Reaching for the phone he called our General Production Manager, and in a deliberate, do-it-or-else manner expressed his feeling.

I don't know exactly what happened after that. But I do know on a prearranged trip just ten days later, the President asked to be shown each of the spots pictured. He wanted to know for himself that something had been done. Nine pictures did in 10 days what reports and threats hadn't even scratched in over two years.

But what of the Internal Auditor? Obviously, I didn't win any popularity contest. However, at my next audit I did notice an increase in the respect I was given. The Plant Manager whose area I condemned, personally conducted me on the most extensive plant tour I've ever had. He conclusively proved all the skeletons, seen or unseen, were gone from his plant.

READINGS OF INTEREST TO INTERNAL AUDITORS

Subject: HOW ETHICAL ARE BUSINESSMEN?

By: The Reverend Raymond C. Baumhart, Harvard Business School
Published by Harvard Business Review, July-August 1961
(Soldiers Field, Boston 63, Mass.)

This article summarizes 1,700 answers to a questionaire on business ethics which was circulated to executive readers of the Harvard Business Review. While the respondents are generally aware and alert to the social responsibilities of business, there is disagreement as to just what is ethical in specific situations. Many of the replies impute a lower level of ethical behavior to the average executive—the "other fellow"—than the respondent considers as applying to himself. In connection with the current concern with "conflict of interest," this article will help in understanding some of the rationalizations which take place in the development of conflicts.

Subject: MANAGEMENT TRAINING AT GENERAL ELECTRIC

By: Gerald L. Phillippe, General Electric Co.
Published in The Controller, August 1961
(2 Park Avenue, New York 16, N. Y.)

Two of the many training programs at General Electric are reviewed in detail in this article—the Business Training Course (for the development of financial personnel) and the Advanced Management Course (for the training of higher-level managers for all functions).

In the Business Training Course, the principal areas of finance and other functional areas of business are covered. Formal classwork training ends after a three-year period, when the men are then placed in responsible supervisory positions—with some assigned to the traveling auditing staff. The auditing work is recognized as advanced training for managerial or responsible specialist positions in accounting and finance. (Mr. Phillippe's own career followed this course, progressing through the financial division to the presidency of General Electric.)

This approach to manpower development gives the individual the necessary encouragement and opportunity to develop his own capabilities, and the program attracts outstanding people who help maintain General Electric's competitive position.

Subject: **THE DEVELOPMENT OF AUDITING STANDARDS AND TECHNIQUES FOR EDP SYSTEMS**

By: **Richard S. Woods, University of Pennsylvania**
Published in N. A. A. Bulletin, September 1961
(505 Park Avenue, New York 22, N. Y.)

Two major areas of auditing that have been affected by electronics are the area of paper evidence (audit trail) and the area of internal control; both of these factors will produce changes in the education of accountants for audit work. The author believes that the audit trail, while altered, is not entirely obscured and illustrates by describing the application of a computer system in a commercial bank.

A description of controls over input, machine operations and output is presented, together with a discussion of internal control from the standpoint of separation of duties. The changes in the auditor's procedures and techniques with EDP entail a considerable job of education for the auditor—so that he may decide intelligently how he must adjust to mechanization.

Subject: **THE MANAGEMENT SERVICE FUNCTION IN PUBLIC ACCOUNTING**

By: **Robert M. Trueblood, Touche, Ross, Bailey & Smart**
Published by The Journal of Accountancy, July 1961
(270 Madison Avenue, New York 16, N. Y.)

Expert knowledge of financial information systems and controls is an essential in the CPA's execution of his function in a professional audit. This same proficiency has, in the past been logically extended to management consulting activities because of the direct connection between the knowledge required to perform an audit and the knowledge used in management services.

Certain management service activities being performed today require training and experience beyond that of the conventional CPA background. The questions and problems raised by this development are examined in this article.

Subject: **PUNCHED CARDS SPEED AUDITS OF CATERPILLAR TRACTOR COMPANY PARTS DEPOTS**

By: **William E. Bergstrom, Caterpillar Tractor Co.**
Published by Journal of Machine Accounting, July 1961
(1750 W. Central Road, Mount Prospect, Ill.)

With the establishment of a number of parts depots across the country, Caterpillar Tractor Co. discovered that the audit program for these depots involved tedious, time-consuming manual methods for the detail check of records. This article presents a picture of the conversion to mechanization and of one phase of audit work, which resulted in a quicker, simpler field audit.

Subject: MANAGEMENT INFORMATION CRISIS

By: D. Ronald Daniel, McKinsey & Company, Inc.

Published by Harvard Business Review, September-October 1961
(Soldiers Field, Boston 63, Mass.)

Many leading companies are plagued by inadequate management information for setting objectives and measuring results, shaping alternate strategies and decision-making. Because of organization changes jobs have been revised, creating new responsibilities and reshaping reporting relationships—thus creating new demands for information.

The author discusses these changes and provides what he feels are the necessary answers to the management information crisis. He states that organizations believe "the most effective way to influence executive action is to control the flow of information into managerial positions." He feels that better data handling is the potent factor in ensuring the effective implementation of new concepts and relationships.

Subject: LINE-STAFF IS OBSOLETE

By: Gerald G. Fisch, Payne-Ross, Ltd.

Published by Harvard Business Review, September-October 1961
(Soldiers Field, Boston 63, Mass.)

The author believes that slavish adherence to the line-staff concept for industries lies at the bottom of many post-war organizational problems. This concept, designed for an elementary communications system, is now obsolete. The capacity of business to handle complex situations through rapid communications has strengthened the hand of the chief executive in terms of his ability to centralize authority and to produce coordination and cooperation between departments.

The criticism and examples presented in this article against the line-staff function leads the reader towards a new concept—Functional-Teamwork. As described in this article, F-T postulates that a "practical organizational system requires a natural division of responsibility," with different functions coordinating with each other in a team effort aimed at achieving the company's goals.

Subject: YOUR COMPANY'S SECURITY PROGRAM . . . HOW DOES IT RATE?

By: John L. Buckley, United Technology Corp.

Published by Office Executive, September 1961
(1927 Old York Road, Willow Grove, Pa.)

The author estimates that dishonest employees will steal more than $1½ billion in cash, materials or merchandise this year alone. The principles of an effective security program are discussed in this article, with a number of examples illustrating the system of checks and balances. This program can be applied to all types of businesses, but management must bear in mind that the mere "assumption" that preventive measures are being followed is not enough—there must be effective testing to see that these measures are being enforced.

Subject: THIEVERY IN THE PLANT

By: Irwin Ross

Published by Fortune, October 1961
(540 N. Michigan Avenue, Chicago 11, Ill.)

Shocking examples of merchandise thievery by employees are described in this article. These gradual, small thefts probably cost American business over a billion dollars a year.

Though employee theft cannot be completely eliminated, it can be drastically reduced. Some of the preventative methods employed by business include personnel investigation both prior to and during employment, physical plant protection, dividing employee responsibility, strict documentation and the use of lie detectors where thievery is suspected. Precautionary measures can work well only with constant application and a non-tolerant attitude on the part of management.

Subject: INTERNAL AUDIT—AN AID TO MANAGEMENT

By: W. R. Seddon

Published by The Accountant, July 1961
(151 Strand, London, W.C. 2, England)

This article describes how the internal auditor can be of help to management in the effective performance of its responsibilities. As an impartial and independent observer, the internal auditor can discover worth-while avenues for future investigations. He must question why things are done as they are and be on the lookout for waste in all forms. All of his work must be related to the basic aims of his business—the policies, products and organization.

WORTH NOTING

THE AUDIT AND THE PUNCHED CARD, AN INTRODUCTION
By A. Wayne Corcoran and Donald F. Istvan. Bureau of Business Research, College of Commerce and Administration, The Ohio State University, Columbus, Ohio. 76 pages. Price $2.00.

HIGHER EDUCATION FOR BUSINESS
By Robert Aaron Gordon and James Edwin Howell. Columbia University Press, 2960 Broadway, New York 27, N. Y. 491 pages. Price $3.50.

ESSAYS ON ACCOUNTANCY
By A. C. Littleton. University of Illinois Press, Urbana, Ill. 637 pages. Price $10.00.

THE EDUCATION OF AMERICAN BUSINESSMEN
By Frank C. Pierson and others. McGraw-Hill Book Co., Inc., 330 West 42nd Street, New York 36, N. Y. 740 pages. Price $7.75.

ADVANCED ACCOUNTING
By Norton M. Bedford, Kenneth W. Perry and Arthur R. Wyatt. John Wiley & Sons, Inc., 440 Park Avenue South, New York 16, N. Y. 781 pages. Price $9.95.

MANAGING DIRECTOR

AS MANY OF YOU KNOW, Brad Cadmus plans to retire as Managing Director of THE INSTITUTE following the Seattle International Conference in June 1962. As the first step in picking a successor, the meeting of THE INSTITUTE's Board of Directors in Montreal approved the appointment of a Selection Committee composed of past presidents Charlie Ghesquiere, Gene Ratliff and Brad Cadmus. This committee will receive applications for the position of Managing Director, interview selected applicants, and consult with the Planning Committee in developing a recommendation for submission to the Board of Directors.

Under the plans recommended by the Organizational Review Committee and discussed at the Directors Meeting, the research and educational work, which has been handled in part by committees and in part by the Managing Director, will be handled by a Director of Research and Education. With this in mind, the general qualifications which would be advantageous for the position of Managing Director as it will be constituted would include:

1. A liking for working with people
2. Background of internal auditing practice
3. Ability to communicate readily—in correspondence, in personal discussion and by formal talks
4. Ability to write easily and clearly
5. Willingness to travel
6. Successful administrative experience
7. An interest in promotion and public relations

Any member who would like to be considered for the position of Managing Director should write for an application form to the chairman of the Selection Committee:

CHARLES J. GHESQUIERE, *General Auditor*
Detroit Edison Company
2000 Second Avenue
Detroit, Michigan

All applications will be held confidential.

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International Textbook Company—Scranton, Pa.

INTERNAL CONTROL STANDARDS AND RELATED AUDITING PROCEDURES
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Ronald Press—15 E. 26th Street, New York 10, N. Y.

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